Psychology for Teachers

C. Lloyd Morgan

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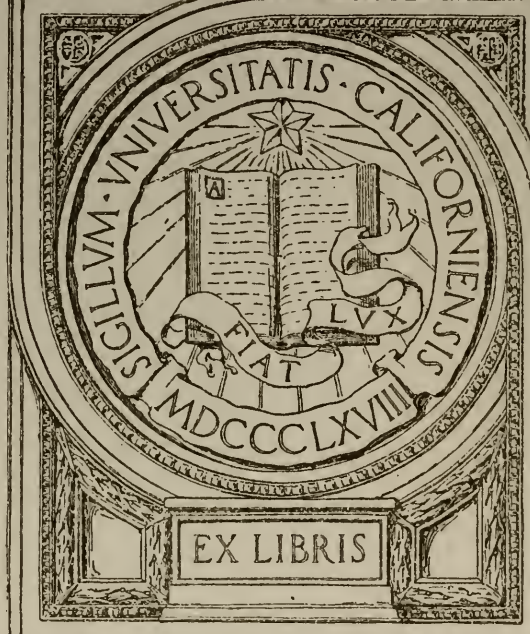

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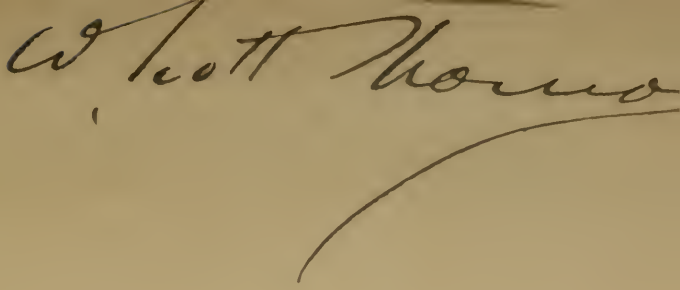

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PSYCHOLOGY FOR TEACHERS

PSYCHOLOGY

FOR

TEACHERS

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WITH A PREFACE BY

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ASSOCIATE SUPERINTENDENT OF SCHOOLS, NEW YORK CITY

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PREFACE

THE present volume was written to meet the requirements of those who came to the author to receive aid in preparing themselves for the profession of teaching ; and the warm reception accorded it by teachers, both in England and in this country, proves that its publication has done much to popularize the study of Educational Psychology.

In the treatment of the subject, no topic has been touched upon which has not been illustrated adequately by facts taken from experience ; and the whole trend of the work is toward the cultivation of right methods of instruction. There appears to have been ever present in the author's mind a desire to furnish aid to teachers in all matters relating to their professional work. In short, it would be difficult to overstate the practical value of the book, since it deals with the problems of school life in a manner calculated to develop interest and arouse enthusiasm. Although in no sense a compendium of the subject, it possesses the merit of stimulating thoughtful and correct views in regard to education ; and no better basis could be furnished for the discussion of the theory and practice of teaching than that which is herein set forth.

The value of a thorough pedagogical training for

those preparing to become teachers has received general recognition during recent years. The improved equipment possessed by those now entering upon their labors has excited the attention of older teachers. The result has been a desire on the part of those who have been long in service to do something to compensate for former deficiencies in theoretical training and so enable them to compete successfully with younger members of the profession. In response to the higher demands made upon teachers, within a few years departments of pedagogy have been established in our universities and colleges ; and Summer Schools for the training of teachers have grown in popularity, since they afford opportunity for receiving such aid and suggestion in regard to practical teaching as are calculated to improve the character of class instruction.

Psychology has always been recognized as a most valuable disciplinary study ; but it has remained for the students of pedagogy to show the importance of its bearing upon educational problems.

To be really serviceable to teachers in elementary schools, a work upon practical psychology requires for its author one who possesses a thorough familiarity with the difficulties involved in the instruction of young children. From no other source can the teacher expect such aid as is required. The charm of the present treatise lies in the naturalness of the presentation, and the perfect accord between the subject-matter and the method. The student is provided with the proper bases of instruction and the best methods of teaching—each and all in strict harmony with the laws of mental growth.

Every earnest teacher must have been assailed by doubts as to the best methods to be adopted in special cases. While no work on the theory of teaching will suffice to meet every requirement, there is still a definite gain to be derived from a consideration of the course followed by people similarly situated. It is far better that one should thus take advantage of the experience of others, than that he should rely wholly upon his own efforts. An undue amount of harm may be the portion of those entrusted to our care, in case we reject the aid of others. The teacher who has had no advantages in the way of assistance and advice, when such services would have been most welcome, may well feel a sense of gratification when he finds that the methods he has followed for years are defended as being thoroughly in accord with the accepted psychological theories of the day.

The scope of the treatment is such as to commend itself to the student. While the author bestows due care upon the explanation of terms employed, so that no doubt may exist as to the meaning which he desires to attach to each, his chief motive is not to teach psychology. Mental processes are viewed in the light of the aid they afford to teaching, and due consideration is given to the kind and amount of effort required by the pupil while acquiring knowledge. The chapters upon Association and Experience contain a large amount of "food for reflection" and deserve the most careful study. The ideal attitude of pupil and teacher toward each other is developed incidentally and upon the highest moral grounds. We cannot fail to appreciate most highly the qualities of one who advises that over the lintel of every

school should be engraved the precept: "Establish a background of sympathy." The perfect assimilation of such a sentiment by the great army of teachers, would result in the introduction of a highly civilizing influence into the schoolroom.

Throughout the book we find allusions to the various educational movements of the day. From certain statements it may be fairly assumed that the author is an advocate of Manual Training in Elementary Schools; that he would give unqualified support to Nature Study in its various forms; and that he would regard well-regulated exercises in Physical Culture as a necessary part of a school curriculum. To an American student of pedagogy, it is interesting to note the opinions of educational writers on the other side of the Atlantic. A thorough comparison of different systems of instruction cannot be undertaken by fair-minded men without being productive of benefit.

When considering the special purpose of a work like the one before us, it does not appear appropriate to comment upon the philosophical views of the author. That he has felt the influence of the *associationalism* of his nation may be regarded as a fortunate circumstance, since the educational world owes a great debt of gratitude to the school whose chief representative has given such earnest attention to the physical, mental, and moral education of children.

In order that the greatest amount of benefit may be derived from a study of "Psychology for Teachers," the student would do well to make constant reference to some good work on the elements of psychology.

About two years ago, it was my good fortune to

find a copy of "Psychology for Teachers" upon the shelves of one of the leading booksellers of this city. After a careful examination, it proved to be the book needed to meet the requirements of a class conducted under the auspices of "The New York Society of Pedagogy," and was therefore selected for that purpose. The discussion of the matter contained in the volume proved satisfactory to more than two hundred teachers. In view of my high appreciation of the book resulting from this practical test of its excellences, I have accepted with pleasure the request of the American publishers to prepare the Preface for a new edition.

HENRY W. JAMESON.

NEW YORK CITY,
June, 1898.

PSYCHOLOGY FOR TEACHERS

CHAPTER I.

STATES OF CONSCIOUSNESS.

I WOULD ask you, reader, to try and recall what has passed through your mind during the last five or six minutes. You will probably have some difficulty in doing so. You have not, you will say, been thinking of anything in particular. But, unless you have been asleep or in a trance, something was passing through your mind ; little perhaps that was definite, but much that was indefinite.

Now vary the observation. Look round the room in which you are sitting. Let your eyes range from object to object for a minute or two, and then consider what has been passing through your mind. You have seen, perhaps, in succession the clock, the fireplace, the arm-chair, the table, a vase of flowers, this picture, that print or photograph, and so on. Some of these may have reminded you of past experiences—the print of the picture from which it has been engraved and where you first saw it ; the flowers of the wood in which you picked them and of the

companion who was with you. The clock may have brought to mind an appointment you have to keep; the fireplace, that a little judicious use of the poker may be advisable. Again vary the observation. Run over in memory the events of your last holidays, where you went, what you did, whom you met; and then once more consider what has been passing through your mind.

All the time you are making these elementary observations you are conscious. That which is in your mind at any moment is *a state of consciousness;* during the few minutes occupied by your observations there was a series or sequence of states of consciousness; and such states of consciousness are passing through your mind all day long. *Psychology is the study of the nature, mode of origin, and manner of sequence of these states of consciousness.* You alone of all the world can say what was the nature and what the sequence of your states of consciousness; and they are the only states of consciousness with which you can become *directly* acquainted. Hence, if you would learn anything of psychology, you must carefully examine your own mind and the nature of your own experience. Such examination is called *introspection.* But by means of language you can compare notes with your neighbors; and by the same means I can communicate to you, through the printed page, the results of my own study. Moreover, by other signs we can learn something of what is passing through the minds of our companions. But we can only interpret the language and the actions of others in terms of our own states of consciousness. If I say that I have seen an ox,

you understand me because you have seen many oxen. If I say that I have been examining the heart of a crayfish, you may not understand me, or very imperfectly; you have probably never seen one, and therefore cannot interpret my words in terms of your own experience. We must always remember how limited is the experience of children, how difficult it must be for them to interpret much that we say to them, and how apt they are through imagination to form false ideas very difficult to correct.

Now, states of consciousness are exceedingly complex—that is to say, a number of things may be in one's mind at once in any moment of consciousness. It is therefore necessary to *analyze* our states of consciousnesss so as to ascertain the elements of which they are made up. Let us suppose that we are looking at the picture on the wall. There it is in what we may call the *focus of vision.* But it suggests certain thoughts which are also present to consciousness. And thus we see dimly the wall on which it hangs, and much besides in what we may call the *margin of vision.* Realize for yourself by actual observation how much you do see indistinctly in this way. Furthermore, though we may pay little attention to them, there are other things present in what we may term the margin of consciousness, sounds such as the ticking of the clock and the flicker of the fire-flame, scents such as that of the flowers in the vase, pressures from the position of the body, and that general feeling which we call either freshness or fatigue. We are apt to consider only that on which our attention is specially fixed—that which is in the *focus of consciousness,* and to neglect the other elements which lie in

the *margin of consciousness.* And I would again urge you to realize for yourself, by actual observation, without which we can do nothing of value in psychology, how much there is in the margin of consciousness of which you are not fully conscious, but merely *subconscious.*

The first result of our analysis of a state of consciousness is therefore the distinction between what is focal and what is merely marginal. It is the focal element to which we attend ; indeed, we may say that attention is the clear, accurate, and decisive focussing of the central element in consciousness ; or, otherwise stated, that attention differentiates the focus from the margin. In children this differentiation is probably less perfect, less rapid, and less under control than in older people. We must be ready to make allowances for them in this respect. The power of bringing out the focus to the neglect of the margin is a valuable gift. It varies a good deal in different individuals. Some people can read a book and follow a difficult train of reasoning amid a buzz of conversation, or in spite of the distraction of a street band. With others the influence of the margin is more disturbing, and the attention is easily distracted. On the other hand, the observant person is one in whom occurrences in the margin of consciousness can rapidly and readily be made focal. For example, a naturalist, when he is out for a walk with you, catches a hundred sights and sounds which for you remain unnoticed. A mouse in the grass, an insect on yonder flower, the note of a rare bird, have caught his observant eye and ear, while yours have been blind and deaf to these sights and sounds. This, too, is

a valuable gift. Fortunate is he who can both focus rapidly and clearly, and yet retains a sensitive margin in the field of consciousness. We should therefore encourage the cultivation of both these gifts in those in whose mental development we are interested.

Let us now consider the focal elements in consciousness, and see what they are, and how they are brought to the focus.

As I look out of window, my eye falls on a distant church-spire, which stands out clear-cut against a background of blue sky. So long as I fix my eyes upon it, that spire is in the focus of consciousness. It forms a sensory *impression*. As we look about from object to object, we have a great number of visual impressions of this kind which are brought to the focus by *stimuli* which affect the retinas of our eyes. While I am looking at the church-spire, however, I hear the chirping of sparrows. At first this is only marginal in consciousness, but presently I cease to attend to the church-spire and listen attentively. The notes of the sparrows are then focal to my consciousness as auditory impressions. In like manner I may have olfactory impressions, or impressions of smell, if I attend to the scent of the flowers in my room; gustatory impressions, or impressions of taste, if I sip a sweet or bitter liquid; impressions of touch, if a fly settles on my hand or forehead; impressions of warmth or of cold, if I dip my hands in hot or cold water. Forgive the iteration of the first personal pronoun; I am anxious to enforce that observation *must be personal and individual*.

These are *impressions of the special senses.* All of them are due to stimuli coming from outside our bodies and affecting special parts of our delicate bodily organization—the eye, ear, nose, palate, or skin. Remember that we are using the term *impression* for that which, through the instrumentality of these stimuli, is brought to the focus of consciousness. A vast number of stimuli are constantly affecting us, often through several sense-organs, or it may be through all the sense-organs at the same time. Of these, some predominate over the others and give rise to the focal impressions; the rest, which are subordinate, give rise to the marginal elements in consciousness. But any of these subordinate groups of stimula may attract the attention, and thus become predominant and give rise to impressions. As I look at the church spire, for example, a particularly vigorous and chirpy sparrow may draw my attention so as to make his note focal. Or a whiff of scent from the flowers may lead me to snuff the air and try to determine whether it is the lilac or the mignonette which chiefly perfumes my room.

Such impressions form a large part of the raw material of consciousness. There are, however, other impressions, less conspicuous and familiar, but of considerable importance in our daily life. Close your eyes and slowly move your head from side to side, turning it on the axis of your neck, and carefully attend to what you feel. You feel perhaps the rubbing of the skin of your neck against your collar; you feel, too, movements in your neck; but you feel also a curious sensation in your head which, if you continue the movements, appears to be akin to dizzi-

ness. There is, associated with the organ of hearing, but independent of that sense, a delicate piece of apparatus which makes us acquainted with changes in direction of the movements of our head or our body as a whole. This it is which probably gives us the sensation above alluded to. Most of us are unaware of its existence, though it probably is of use to us in our active life. The effects of the stimuli from this organ are for the most part marginal or subconscious, and we seldom attend to them so as to bring them to the focus of consciousness. For many animals they are probably of more importance than they are for us. We may call these *impressions of direction;* but we must remember that we seldom focus them as impressions. They generally take their place unnoticed in the margin of consciousness.

Now make some further experiments and observations, so that you may assure yourself of the reality of *motor impressions*—that is to say, impressions of the movements of your limbs. Look at the clock-face or any other particular object; shut your eyes; and, not too hurriedly, point your finger at the object. Do this twice or thrice, still with your eyes shut, and note your states of consciousness. You will, I think, notice two things. First, you picture to yourself, though you do not see, the movements of your hand and arm: this we may neglect for the present. Secondly, you feel pretty clearly the movements of and in the limb as you bring it into position. Stimuli from the joints, skin, muscles, and so forth, give rise, when you pay special attention to them, to motor impressions. It is possible that you

have never had occasion to pay attention to these before. They have remained for the most part as marginal elements in your consciousness. I am desirous that you should fully realize that such motor feelings are elements in consciousness. Draw a circle in the air or on the blackboard with your eyes shut: you will feel with surprising distinctness all the movements of your arm. You will also draw nearly as good a circle as you could with your eyes open. Walk about the room: every change of position of your legs is felt. Let your eyes wander from object to object and pay attention to their movements in the sockets: a little practice will enable you to feel them quite clearly. Now hold up a pencil or penholder about eight inches from your face and in the line of vision of the picture on the far wall. Alternately fix your eyes on the end of the pencil and on the picture, and attend to the feelings in and round your eyes. Do you not feel quite plainly your eyes going, so to speak, from the one to the other? The eyes have to be accommodated first for near vision, then for far; and when you attend to the matter, you focus in consciousness these motor impressions of accommodation. Generally, however, these elements in consciousness are merely marginal and subconscious.

There is one more group of impressions for us to take note of. They are due to stimuli from the internal organs and from parts at some little distance beneath the skin. Lay your finger lightly on your neck: you have an impression of touch on the skin of the neck. Now press with increasing vigor: you are conscious of an impression from the deeper

parts of the neck, probably accompanied by incipient pain. This impression is quite different from that of touch, and, though it may originate in the muscles, is quite different also from a motor impression. Hunger, thirst, fatigue are probably of this kind. We need not linger over these *internal impressions*—generally due to pressures, strains, or some unwonted condition of the parts concerned; but we may notice that they are generally suffused with pleasure, or, more frequently, with pain or discomfort.

Let us now sum up what we have learnt concerning impressions. They originate from stimuli affecting parts of our bodies; and they occupy the focus of consciousness. They may be either—

1. Impressions of the special senses—sight, hearing, taste, smell, touch, heat, cold, or direction of movements of the head;
2. Motor impressions; or—
3. Internal impressions, such as pressures, strains, hunger, thirst, fatigue.

When the stimuli which may give rise to impressions are subordinate to other more powerful stimuli, they give rise to marginal elements of which we are not clearly and distinctly conscious, but are only indistinctly subconscious. The impressions and the marginal elements, alike due to stimuli, are, however, similar in their nature, and differ only in the fact that whereas the impressions are clear and focal, the marginal elements are indistinct and subconscious.

In our adult years a great deal of the business of life is transacted in the marginal or subconscious

region. In matters of skill, for example, though the acquisition and perfecting of control over our bodily activities is focal and demands attention, yet when the skill has been acquired and is well established, the subsequent performance of the activities is to a large extent relegated to the margin. We learn to walk, to run, to knit, to play the piano, to ride a bicycle ; and the learning requires constant focal attention. But when the skilful performance of these actions has by practice become perfect, we may do any of these things, and do them well, while the focus of consciousness is occupied with other impressions. The peasant woman knits and walks ; but in the focus of her consciousness is yonder fair-haired girl whom the stalwart young fellow is, quite unnecessarily, helping over the stile. The pianist's fingers are running softly over the keys ; but his eyes and thought are fixed on his mother's portrait. The cyclist bowls along the road ; but it is the delicately-shaded greenery of the spring that holds his attention. And in these cases the actions are not performed unconsciously, but subconsciously. The cyclist guides his machine, avoids stones in the road, and adjusts his output of energy to the gradient, in response to stimuli coming from without. But the skill he has been at the pains of acquiring has become so far a *habit* that it no longer requires his focal attention. Marginal awareness suffices for the guidance and control of his machine. This again is a matter in which I would beg you, reader, to exercise self-observation. Only by doing so will you fully realize how much goes on in the margin of your consciousness. And not only is this true of our active life ; it is true also of

our thought. Who does not know, from personal experience, that, perhaps even during a sermon, there are undercurrents of thought? It is indeed only during the most concentrated attention, if even then, that the undercurrents are wholly absent. In ordinary attention all that we do is to keep these undercurrents duly subordinate.

Sometimes we have to divide our attention, and hold two series of impressions, or two parts of the same series in the focus. Thus, we may read a book and listen to a piece of music or a conversation. Such *divided attention* is generally rather a strain, and we get the best neither out of the book nor the music. A familiar instance of attending to two parts of a series at the same time is afforded when we are taking notes of a lecture. We are at the same time putting down the notes of what the lecturer has just said and listening to what he is saying. I lately watched a student thus taking notes. It was curious to observe how far his pencil was behind the spoken words, but he got quite correctly the gist of all the lecturer said.

To resume. Impressions and the marginal elements due to stimuli form the raw material of consciousness. It must be remembered that the state of consciousness of which we have practical experience in any moment of our waking lives comprises, besides the impression in the focus, all that is contained in the margin of consciousness. Focus and margin conspire to form the state of consciousness; and it is only by analyzing the state of consciousness that we distinguish the focus from the margin.

We must now pass on to consider what else, other than an impression, may occupy the focus of consciousness.

When we are sitting quietly and are recalling the sights and sounds and scents of a pleasant walk in the country, our minds are dealing, not with present impressions, but with the revivals in memory of past impressions. Such revivals are termed *ideas*, or, to particularize them more accurately, *sense-ideas*. The images that float before the mind's eye, the recollected notes of the nightingale, or the perfume of May blossoms, are examples of sense-ideas. They are not due to stimuli coming from without, but arise through suggestion in ways which will be considered in the next chapter. But though they do not directly owe their origin to external stimuli, they do so indirectly; for, in the absence of visual impressions of trees and fields and hedgerows, we could have no images of any of these things as sense-ideas. And so with other forms of sense-experience. It is clear that if we have never heard the notes of a nightingale, we cannot recall these notes as sense-ideas. Impressions, then, are matters of direct experience; the sense-ideas which represent them are like the echoes of this experience. Hence we say that impressions are *presentative*, and the corresponding sense-ideas *re-presentative*. Many of our words are presentative signs or symbols which suggest re-presentative ideas. We have, for example, an impression of an animal for which, we are told, the name-sign is "sheep." Afterwards the presentative word "sheep" suggests a re-presentative idea of the animal. The re-presentative idea is, however, entirely dependent upon our

actual presentative experience of sheep. There can be no sense-ideas without previous sense-impressions. We must never forget this when we are teaching young children. The range of their sense-ideas is limited to the range of their direct experience. Words for objects of which they have no direct experience are little more than mere sounds.

The classification of sense-ideas precisely corresponds to the classification of the impressions of which they are the re-presentative echoes. Thus we may have ideas of the special senses, motor ideas, and ideas which re-present the internal impressions. But the several kinds of sense-ideas vary a good deal in clearness and definiteness; and different individuals differ not a little in their power of clearly re-presenting their sensory experience. Some of us visualize clearly. I can visualize distinctly anything of which I have recently had a definite, clear-cut, visual impression. I have also tolerably clear auditory ideas. I can re-presentatively hear the notes of a violin, or French horn, or piccolo. My ideas of touch-impressions are rather vague; and my ideas of taste and smell are not at all definite. If I try and recall the taste of an orange, a pineapple, an acidulated drop, they are by no means clearly distinguishable. On the other hand, my ideas re-presentative of the impressions of direction of rotation are much more definite, perhaps because I have experimented with myself a good deal in this matter. I would ask the reader to exercise some self-observation, and ascertain what his own powers are—how far, for example, he is able to form an idea of the taste of shrimps at all comparable to his visual idea of this succulent

animal. So too with regard to motor ideas. My own motor ideas are remarkably distinct. I can re-present to myself quite clearly any of the familiar movements of my limbs; if, for example, I think of the movements necessary to carry my hand to the back of my neck, I feel them re-presentatively far more clearly than I can re-present to myself the smell of a rose. The ideas which correspond to internal impressions are very vague, and to a large extent are emptied of the pleasurable or painful accompaniment which characterizes the impressions themselves.

We must remember that the idea, as such, occupies the focus of consciousness. In this respect it is precisely analogous to the impression. And just as there may be a large body of presentative elements in the margin of consciousness, so too may there be a large body of re-presentative elements in the margin of consciousness. As we recall the events of our pleasant country walk, there are (1) the sense-ideas in the focus of consciousness; (2) a good deal of re-presentative margin, forming the background of the ideas; and (3) a certain amount of presentative margin, due to the stimuli which are affecting our special senses, the sounds, scents, touches, and so forth, together with motor elements due to the positions of our limbs and pressures from our attitude. Neglecting these presentative elements in the margin, it would seem that the focal ideas are not so clearly marked off from the re-presentative elements in the margin of consciousness as is the case with impressions. Indeed, in certain states of reverie, our consciousness seems all margin, without anything definite in the focus. Our day-dream is peopled with shadowy

phantoms which dimly flit across the scene with delightful inexactness of outline.

There is one more point to notice about sense-ideas, and it helps to show why they are often less clear-cut than the impressions of which they are re-presentative. The impressions are always of particular objects. If we let our eyes range over a flock of sheep, each individual sheep may come to the focus as an impression. But if, as we sit at home, we recall our experiences in the field, what we visualize is not any particular sheep, but what is common to a number of individuals. We can indeed visualize either a white sheep or a black sheep; but neither of them has that perfectly clear-cut individuality which the impression of a sheep would have. Just as the word "sheep" is a common noun, or a name common to a number of individuals, so is my idea of a sheep a common, or, to employ the technical term, a *generic idea*. Hence what we visualize most clearly is the particular object or person. I can visualize quite distinctly the cottage in which I lived at the Cape, with its convolvulus-covered stoep or verandah, the pear tree in front of it, and the cliffs of Table Mountain which rose at some distance behind it. All of this is particular. But I cannot visualize in the same way "cottage," because I have seen so many cottages. Thus, *the impression is always particular; but the sense-idea may be either particular or generic.*

So far as our analysis of states of consciousness has at present carried us, we may have, in the focus, impressions or their corresponding ideas; and, in the margin, presentative elements due to subordinate

stimuli, and the corresponding re-presentative elements. Let us now proceed a step farther. There lies before me a stick of sealing-wax, which gives rise to a visual impression as I look at it. And close by it there lies a penwiper. As I look from one to the other, I am struck by the fact that the color of the wax is the same as the color of the penwiper. In the act of perceiving the similarity of the color, this particular element in the impressions becomes *predominant,* to the subordination of other elements. On my desk there lies also a book bound in red ; but the color is deep and full, and I perceive that it differs from the vermilion-red of the sealing-wax, and from that of the piece of blotting-paper on which my manuscript rests. Now, in such cases we *perceive* the similarity or the dissimilarity of the colors. What we thus perceive is called a *relation.* We perceive the color-relations of certain visual impressions. These relations are not impressions of the same kind as those we have so far considered. The impressions of sense are due, as we have seen, to stimuli ; but we know nothing of any stimuli which give rise to the feeling or consciousness of relation. And yet this feeling is one that is quite distinct. We know that the darker red is due to stimuli of a particular kind, and that the lighter red is due to stimuli of a slightly different kind. The related reds are thus both parts of sense-impressions ; but the relation itself is not, so far as we know, due to stimuli. It seems to take its origin in *the transition of consciousness* from the darker red to the lighter red. But since the transition is between impressions due to stimuli, we may conveniently widen our definition of

impressions so as to include these transitions—terming them *impressions of relation*. And we may speak of a relation as presentative when it is perceived to hold good between two presentative impressions ; and as re-presentative, or an *idea of relation*, when we think of the relation between two sense-ideas, or between a sense-impression and a sense-idea. We may have, for example, sense-ideas of the deep green of the Scotch fir and of the tender green of the budding larch, and may then perceive their relationship, and thus have an idea of relation, which is the transition in consciousness, not between presentative impressions, but between re-presentative ideas.

It need scarcely be said that it is not only of colors, the example here chosen for purposes of illustration, that relations hold good. We perceive the relations of scents, of sounds, of tastes, of touches, of pressures, of changes in the amount and direction of movement. We perceive relations of size, of weight, of intensity, of temperature, of hardness. It is not too much to say that all our thought and all our intellectual knowledge are dependent upon the *perception of relations ;* and that for us the transitions in consciousness from impression to impression, and from sense-idea to sense-idea, are quite as important as the sense-impressions and sense-ideas themselves.

We must learn to distinguish carefully between *sense-experience* or *sensation* and perception. The term "sensation" is rather a puzzling one in psychology. We may altogether exclude the popular use of the word, when we say, for example, that a book or an actor has created a sensation. First, then, the word "sensation" is used in psychology

as a general name for the faculty (by which we mean any special mode of the exercise of consciousness) of experiencing impressions or ideas of sense. We shall employ the term "sense-experience" for the experience gained through sensation. We need, however, a verb to answer to sensation, as the verb "perceive" answers to perception. I shall use the verb "*to sense*" for this purpose. So far, the term "sensation" does not present any great difficulty. But the results of the analysis of impressions are spoken of as "sensations." Thus we say that an impression of sight is due to a number of visual sensations; and we speak of sensations of touch, and of motor sensations. Often the words "impression" and "sensation" are used as synonymous. Thus we speak either of an impression of sound or smell, or of a sensation of sound or smell; either of a motor impression, or of a motor sensation. In such cases we are unable to analyze the impression into distinguishable sensations; or, in other words, the impression is a homogeneous sensation, whereas in the visual impression we may have of an apple there are a number of distinguishable sensations of red, green, and so forth. It will be noted that the word "sensation," as a general term for the sensing of impressions, cannot be used in the plural, or with the indefinite article; but we speak of "a sensation" or "sensations" when we refer to those elementary factors of impressions of sense which are disclosed by psychological analysis.

Sensation and sense-experience, then, deal with impressions and ideas of sense; while perception introduces us to what have been termed impressions

and ideas of relation. We may now proceed a step farther.

Looking at the sealing-wax and the penwiper, I again perceive the similarity of color, and, glancing up at my shelves, I see, here and there, books the bindings of which present just the same vermilion color. Now, leaning back in my chair with closed eyes, I cause visual ideas of the sealing-wax, the penwiper, and the books to pass before my mind's eye. In each of these visual ideas the color-element is predominant; and then I think of the vermilion color which is common to all of them; and as I do so the different margins of subordinate elements fade away, leaving the idea of vermilion in possession of the field. Such an idea, re-presentative of an element common to several or many impressions, is termed an *abstract idea.* It results from, first, *generalizing* the effects of predominant elements in several sense-impressions; secondly, perceiving the similarity of these predominant elements, each to each; and lastly, abstracting this predominant element from the subordinate elements with which it is associated. When the element is merely predominant, the subordinate elements are still present in the margin of consciousness; but when the abstract idea is reached, the subordinate elements, so to speak, neutralize each other, and are ignored or neglected. Redness is thus an *abstract sense-idea.* Our language is full of words which signify elements or qualities of sense-impressions floated off by abstraction from the other elements or qualities with which they were associated in the sense-impression as it was actually experienced. The process of attaining, through gener-

alization, to an idea of that which is common to a number of particular experiences, is termed *conception.* We *conceive* redness, size, weight, hardness, and so forth. We can conceive also virtue, beauty, truth, apart from the particular persons by whom, or the actions in which, these excellencies are exemplified.

We can also, through generalization, reach a conception of relation. Suppose that we perceive that this piece of string is twice as long as that piece; this bullet twice as heavy as that bullet; this note twice as loud as that; this pressure twice that; this light twice as brilliant as that. The same relation, which we may call that of "twiceness," or of two to one, holds good for all these varied experiences. In the act of perceiving the relation in each case we make it predominant. And when we think over the experiences we neglect or ignore the subordinate elements therein, and rise to an *abstract idea of relation.* The abstract idea of relation has two points in common with the abstract sense-idea (such as that of redness): (1) that it is the result of generalizing from several or many particular experiences, and (2) that it is, so to speak, floated off from actual experience, though it arises therefrom.

As it is important to distinguish between sensation and perception, so also is it important to distinguish between perception and conception. *Perception deals with particular instances; and we perceive a particular relation. Conception deals with the results of generalization; we conceive the quality or relation as common to a number of particular cases.*

We may now classify as follows:—

FOCAL TO CONSCIOUSNESS.

Presentative.	Re-presentative.
SENSATION.	
Impressions of sense (analyzable into sensations).	*Ideas of sense or sense-ideas.*
PERCEPTION.	
Impressions of relation (*i.e.* transitions in consciousness between sense-impressions).	*Ideas of relation* (*i.e.* transitions in consciousness between sense-ideas, or between a sense-idea and a sense-impression).
CONCEPTION.	
(There are no impressions under the head of conception. The presentative material is given in Sensation and Perception).	*Predominant and Abstract sense-ideas.* *Predominant and Abstract ideas of relation.* (Both as a rule generalized.)

It must be remembered that the above classification deals with what is focal to consciousness, and that states of consciousness as they are actually experienced comprise a great deal that is marginal. During healthy normal waking life there is always much that is presentative in the margin of consciousness. It is this that in the midst of our abstract thought, or our flights of imagination, keeps us in touch with our immediate surroundings and the practical realities of our life. But the margin may contain in addition to these presentative sense-elements, and in addition to re-presentative elements of the same category, further elements due to per-

ception and conception. For intellectual men and women, who deal largely with knowledge and the relations of phenomena, all that they see and hear, all their experience, is set *in a relational background.* Their impressions and their ideas of sense are something more than mere impressions or sense-ideas. Set as they are in a relational background, the objects of sense are suffused with *meaning.* This it is that makes us rational beings.

Much therefore depends, not only upon the nature of that which is focal to consciousness, but upon the relation of this focal object to the margin, or the mental background, as we may term it. Where an object of sense is set in a background which contains no other elements than those introduced through sense-experience, it may be termed a *sencept.* When the impression or idea is set in a background of perceived relations, we term it a *percept;* and where it is set in a background of conceived relationships, we apply to it the term *concept.* These terms will not, however, have much significance for us until we have learned more concerning perception and conception.

We have, in this chapter, been considering only that which is termed the *cognitive* aspect of consciousness. *Cognition* deals with our knowledge and all that leads up to it. Nothing, or scarcely anything, has been said concerning those aspects of our conscious life which are comprised by psychologists under the *emotions* and the *will.* These we must leave for future consideration.

CHAPTER II

ASSOCIATION

We have seen that in any moment of consciousness there is, in addition to the focal impression or idea, much that hovers indistinctly in the margin of the mind's eye. A state of consciousness, as we have defined it, includes both the impression or idea in the focus and all that there is in the marginal region.

Now, when we are experiencing a series of visual impressions—are looking, for example, at a row of figures—each member of the series occupies the focus of consciousness in succession. But when any one impression is succeeded by another, it does not at once and altogether disappear out of consciousness. It ceases indeed to be focal, but it is carried on in the margin. As you read slowly what is printed on this page, you experience a series of visual impressions which suggest certain ideas. But as each visual impression and its idea ceases to be focal, it does not at once lapse out of your consciousness: it passes into the subconscious margin. If you did not thus retain in mind what was said at the beginning of a sentence or a paragraph, how could you possibly understand what was said at its close? How could you detect any fault in construction or fallacy in

reasoning? A simple arithmetical series will afford an illustration of this carrying on into the margin. Take 7, add 5, divide by 2; answer, 6. A quick child can do this "in his head" without difficulty. But it would be impossible to perform this simple series of arithmetical operations if, when the sound "two" fell on his ears, the idea of "seven" had already lapsed altogether from consciousness. I would urge the reader to make observations on his own mental sequences so as to realize this carrying on of focal elements into the margin of consciousness. It plays an important part in giving continuity to our thought and experience.

But the effective carrying on of elements in consciousness, and the power of utilizing what is thus carried on, varies much according to the degree of mental development. There is a story of a yokel who was told that "the farmer had given Jim the sack." He asked slowly, "Who's given Jim the sack?" And on being told it was the farmer, scratched his head and asked, "What's farmer given Jim?" When this question was answered, the yokel asked, "Who's farmer given the sack to?" And so on, round and round. His consciousness could not hold all three— farmer, Jim, and the sack— in one synthesis. Some children seem unable to perform even a simple series of arithmetical operations "in their heads"; either the carrying on into the margin does not occur, or they are, as yet, unable to utilize the material so carried on. The teacher must be ever ready to make allowances for such immaturities of faculty.

The gradual *fading of impressions and ideas,* instead of their sudden and instantaneous cessation in

consciousness, is sometimes said to fall under the head of memory. It is more satisfactory, however, to apply the term *memory* to those mental occurrences which are involved in the *recall,* or re-presentation, of what has for a longer or shorter period completely faded out of consciousness. Thus we may remember events which have not in any way been present to consciousness for weeks, months, or even years.

The phenomena of memory involves three things: first, *registration*; secondly, *retention*; and thirdly, *recall* or reproduction. It is clear that registration and retention are not the same. If we register a fact in our diary with ink which fades in a week, there will be no retention of the fact registered beyond that limited period. But in what way the effects of impressions are registered and retained we are scarcely in a position here to consider. The registration is effected somehow in our brains, and the effects so produced are in some manner retained by the brain-structures. When we speak into a phonograph, the effects of our voice are registered on the cylinder of the instrument, and are there retained in such a way that the sounds can be reproduced at any subsequent time. The sounds themselves are not in any way retained; but the conditions of their reproductions are established. This is only a rough analogy; but it helps us to understand the kind of way in which, though the mental impressions, as such, cannot be retained by the brain, the conditions of their reproduction may be impressed upon the brain-structure. It is probable that retentiveness is a natural gift which is not in any marked degree susceptible of improvement. We must just make the best we can of the

natural memory of which we stand possessed. But the power of recall, within the limits of our natural retentiveness, can be very markedly improved. If we use the term *remembrance* for the natural coming to mind of ideas without conscious effort, and the term *recollection* for the process of, so to speak, hunting up an idea, then we may say that *remembering is a natural faculty but recollecting is an acquired art.* And in this terminology we may speak of "trying to recollect," but not of "trying to remember." Upon what the art of recollecting is based we will consider presently; we have first to see upon what the natural faculty of remembering depends.

It depends upon what are termed the *laws of association* of impressions and ideas, and especially upon that which is called the *law of contiguity.* This law, in so far as it applies to impressions and ideas, we may formulate as follows: If any two focal elements in consciousness, *c* and *l*, occur in successive moments of consciousness as impressions, the subsequent recurrence of *c* as an impression or idea will tend, under similar marginal conditions, to suggest the recurrence of *l* as an idea. We are out for a country walk, for example, with a naturalist, and hear a peculiar laughing, hawk-like note. "That's the alarm note of the hen cuckoo," he says. An association is thus formed between that particular sound and the name "cuckoo," with all that it suggests. And henceforward, so long as the association-link holds in memory, that sound suggests the name and idea of a cuckoo. I well remember the first perch I caught. I had pulled out some gudgeons, and held them firmly in my small hand to unhook them. I therefore did the

same with the perch, and had painful experience of his prickly fin. An association was formed between the sight of a perch and its sharp fin spines which led me to be more careful for the future.

It is scarcely necessary to point out how important is the establishment of association-links in the acquisition of practical experience. Our cradle-days are largely spent in such self-education. Without the formation of association-links there would be no profiting by experience. Were a child to scald his tongue with hot porridge fifty times in succession, of what avail would it be to him if the sight of the steam did not suggest through association an idea of the consequences previously experienced, in the light of which he could exercise control over his actions? The value of association in practical experience lies in the fact that ideas are suggested with sufficient rapidity to intervene between impressions (such as those of the sight of steaming porridge and the burning of one's mouth), and through their intervention render possible the guidance of our actions. Our cradle-days, I repeat, are largely spent in gaining experience of this homely, practical kind, thus rendered available through association.

And when we pass from the cradle to the nursery, from the nursery to the garden, thence to the playing-fields, and so into the wide world, the same kind of practical self-education through experience is our constant guide. All our practical acquaintance with the nature of things, with their effects on each other and on ourselves, with what we can do and what is beyond our powers,—all this is rendered serviceable to us through association. As impression after im-

pression glides through the focus of consciousness, each becomes linked through association to its successor; and as it fades away through the marginal region, lapsing more or less rapidly out of our consciousness, it does not pass altogether beyond recall; for the linkage of association binds the whole series into a chain. Now, if the nature of our conscious life were such as always to present us with new impressions—no one impression occurring twice—this association linkage would be of no practical service or value. For the law of suggestion through association is that when two focal elements, *c* and *l*, succeed each other as impressions, the subsequent recurrence of *c* will tend to suggest the recurrence of its successor *l* as an idea; and if there was always a succession of *new* impressions, it is clear that there could be no such *recurrence* as is essential for suggestion through association. The nature of our practical experience is, however, such as to present the same impressions, often in the same order of sequence, again and again. And the law of suggestion through association expresses the fact that when an impression *c* does so recur, it tends to suggest an idea re-presentative of the impression *l* which originally followed *c*. If, for example, a child is brought into the study of his father, who is a smoker, the child will see his father strike a match, will hear the "quick, sharp scratch," and will see the spurt of flame. These will become associated. When on a subsequent occasion the father takes up the box of matches, the ideas of striking, of the sharp, grating sound, of the flash of flame, will be suggested. And the ideas so suggested will be reinforced by the recurrence of the series of im-

pressions. The repetition of the series will reinforce the association, and will render the recurrence of the ideas in due sequence on a subsequent occasion more probable.

Association thus begets *expectations*, and when the expectations are repeatedly fulfilled they grow in strength and become ingrained in the mental nature. It is through these expectations, affording as they do data for the guidance of action, that experience is practically serviceable. And the rudiments of this serviceable experience are gained in the cradle, extended and strengthened in the nursery, and amplified in all the subsequent practical commerce with the world. The gaining of the experience is, moreover, a purely individual matter. But it is a matter in which parents and teachers afford aid and guidance. Our aim here, in the education of sense-experience, is to give the infant or the child, or the developing boy or girl, opportunities for the acquisition of healthy, wholesome experience. The acquisition itself is an individual matter; all that we can do is to secure satisfactory conditions for self-development. And this is a matter which requires tact and judgment. The world is full of objects which are either at once unpleasant and harmful, or pleasant for the moment but harmful in the long run. We have to furnish the conditions for the gradual but sure acquisition of experience of these objects. The child who never has a chance of bruising his body or mind against these objects will not be prepared to avoid contact with them when he is older. He will have to gain his experience of them some day; when this day shall come, it is often by no means easy to decide.

So far we have been considering the mere sense-experience of the world in which the child develops from infancy to manhood; so far we have been merely regarding him as a healthy, active, vigorous animal, one who is wide awake to the practical nature of things, and can walk sure-footedly along the path of his animal life. All this practical experience is dependent upon association; it must be individually acquired, but it may be acquired under conditions specially presented. The presentation of these appropriate conditions falls within the function and office of the teacher.

But man, though he possesses a healthy animal nature, is also possessed of faculties which are distinctly human. He is, for example, among other things a talking animal—one who can communicate with his fellows. And it is clear that the acquisition of language, the medium of communication, is dependent upon association. The child who sees the dog, hears also the word "dog," or "bow-wow"; again and again the sight of the animal is followed by the sound of its name, and the sound followed by sight. The two become closely linked, so that the one suggests the other. All the common objects of daily sense-experience are thus associated with sounds of suggestive value. And when the child begins himself to speak, a further association is formed between the sight of the object, the sound of its name, and the impression due to the utterance of the word. The dog seen and heard, the word "dog" or "bow-wow" heard and uttered, all become associated together.

It is important that, so far as is possible, the

association should be a direct one between a sense-impression and its name. We give our children picture-books in which a number of animals, from a mouse to an elephant, are portrayed, more or less inaccurately, of about the same size. The child learns to associate names with some or all of these; but I question whether such associations are of very much value. The object of a picture is to suggest to the mind that which is pictured. For us who have seen a lion or a rabbit, the pictures of these animals have due suggestive value; for us, who understand scale and perspective, there are the materials, in an adequate picture, for recalling to mind or indicating the animal as it really is. But for the child the impression produced by the picture is presumably simply a new impression of a particular order, and has little or no suggestive value. The name associated becomes the name of that picture-impression, not the name of that which the picture represents. A child who could give the names of the animals in his natural history picture-book was shown a shrew mouse and asked what it was. After some hesitation, he said a tapir. Possibly it was the long snout which suggested this answer. It is always well to establish associations between the actual objects and their names.

When, at a later stage of his development, the child is learning the suggestive value of written symbols for the word-sounds with which he has already become acquainted, further associations are established. The name "dog" as heard and as uttered is associated with the visual impression of the name as written or printed, and sooner or later with the motor

impressions of writing the name. And here comes in one of the great difficulties which both the child and the teacher have to meet and overcome. The word "cat" as heard is a comparatively simple auditory impression; the word "cat" as uttered affords motor impression that is not very complex; and the word "cat" as seen is a visual impression of no great complexity; but the word "cat" as *spelt* involves an operation of no little difficulty. It involves the analysis of the word, as seen, into three constituents, c, a, and t; no one of these three constituents, as named, has the same value, either for hearing or for pronunciation, as it has in combination in the word "cat"; and yet the child has to grasp that when these three symbols he calls c, a, t, unite to form the word, that word is pronounced "cat."

With the analysis and synthesis involved in spelling we are, however, not at present concerned. It is to the associations involved that we have to direct our attention. The sound (auditory impression) of the word "cat," and the pronunciation (motor impression) of the same word have already been associated with each other, and with the sight (visual impression) of a particular animal or species of animals. These are now further associated with the sight of the word "cat" as written or printed. On the method of teaching to read by words rather than by letters, which is certainly psychologically justifiable, the association is a direct one between the sound of the word and the visual impression of the word as a whole. But when the analysis of spelling is subsequently introduced, further associations are established, (1) between the sight of the constituent "c"

by itself and the name "C" which we give it; and (2) between the sight of the constituent "c" as combined with "at" in the word "cat," and the hard "k"-sound for which it then stands. This double association is not very simple, and is somewhat confusing. We should not therefore feel surprised if the child has some difficulty in mastering it. And when the child begins to write, yet further associations have to be established between (1) the movements of the fingers (motor impressions) necessary to form the letter "c," (2) its name "C," and (3) its "k" sound value in the pronunciation of the word "cat." In some foreign languages these initial difficulties are somewhat reduced; but the French child who has to struggle with "chat" is not much better off than the English child who has to contend with "cat."

When, now, these associations have been established, the sound of the word "cat" may suggest (1) a visual idea of the animal, or (2) a visual idea of the word "cat," or (3) a motor idea of the pronunciation of that word; while the visual idea of the word may further suggest its analysis in spelling. When a given impression may suggest one of several ideas—such as those numbered (1), (2), (3) above—we speak of *divergent association*. And, conversely, when several impressions, such as the sound of the word "cat," the sight of the word, or an outline picture of the animal, suggest the same idea—*e.g.* the visual idea or mental image of the animal—we speak of *convergent association*. Both convergent association and divergent association are of great psychological value.

The earliest words used by (and probably also the

earliest words understood by) children are those which are symbolic of what we may describe as elementary modes of conscious experience, such as sense-impressions, motor impressions, and their simple emotional accompaniments. Words involving impressions of relation come later; but the manner of their association with the modes of experience they symbolize is of like nature to that which has been briefly described. The progress of the child in the use of language is to a large extent the index of its progress in mental development. We are not, however, at present endeavoring to trace the stages of this development. Our immediate subject is association; and the association of words with the modes of consciousness they symbolize is throughout similar in its nature.

A good deal of the work of the teacher in the initial stages of education is concerned with the establishment of associations which must of necessity seem to the learner—in so far as he troubles his little head about the matter—quite arbitrary. It is rather the fashion nowadays to inveigh against learning things parrot-fashion. But a good deal of parrot-work is necessary and quite unavoidable. The multiplication table, the tables of weights and measures, the vocabularies of foreign languages, declensions and the conjugation of verbs, rules and their exceptions, the dates of certain salient events,—these and much besides must be committed to memory, that is to say, linked by direct association. And here the boy or girl of strongly tenacious memory has a great advantage over his or her companions who are less favored by natural endowment. There would seem to be no necessary connection between a retentive memory and

power of understanding and comprehending. The boy who has a naturally retentive memory is one in whose mind associations, once formed, hold good, so that when once *c* has been associated with *l*, the recurrence of *c* at once and with certainty, under appropriate conditions, suggests *l*. And this seems to be quite independent of whether the relation which *c* bears to *l* is understood or not. The boy who has such a memory has, I repeat, a great advantage over his fellows in the early stages of his school career, and if he have good powers of understanding as well, the advantage is a permanent one. His less fortunate comrade has to spend far more time in the drudgery of establishing with difficulty abiding association-links. But, however good his understanding, such drudgery is essential if he is to attain success. Few subjects are more dependent on understanding and the perception of relations than mathematics, and yet perhaps in no subject is either a naturally retentive memory or much drudgery in the establishment of associations, one or other, more essential. Furnished myself with fairly quick understanding, but wretched natural power of retentiveness, I had, as a boy, little difficulty in following a proposition of Euclid or grasping the explanation of a mathematical problem. My master, pleased with my quickness, but too lenient to insist on the drudgery which was absolutely necessary in my case, failed to make me acquire that groundwork of fixed associations without which no one can become a mathematician. And for this in due course I had to suffer.

I shall not, I trust, be misunderstood when I contend that parrot-work and learning by rote, often a

matter of somewhat wearisome drudgery, are essential for the establishment of associations necessary for mental development. Of course the understanding must be trained and exercised at the same time. But to understand and to remember, or to be in a position to recollect, are not the same thing, and are not even necessarily connected. And if we would make progress in knowledge, we must remember as well as understand. There can be little question that, for child as for adult, the exercise of the understanding is more pleasurable than learning by rote. It is part of the art of the teacher to preserve a due proportional relation between drudgery and interest. And much may be done to lighten the drudgery by sympathy. Over the lintel of every school should be engraved the precept: *Establish a background of sympathy.* The child will do much that is irksome to give pleasure to one with whom he is in sympathy. This condition of sympathy should be a permanent element in the marginal region of the consciousness both of teacher and of taught.

And perhaps nowhere in the early establishment of associations is the background of sympathy more essential than in the matter of rewards and punishments; and nowhere is tact and judgment more urgently required. In the animal life of sense-experience the commerce with the world brings with it, more or less swiftly and directly, its pleasures or its pains. And these associations of pleasurable or painful results with particular actions are of the utmost service in the guidance of life. But when we are laying the foundations of a structure of knowledge, built upon the solid ground of sense-experience, but

rising above it, these natural incentives or deterrents are no longer of the same guiding value. We have to institute an artificial system of rewards and punishments as incentives to industry and deterrents from idleness and inattention. What the rewards, what the punishments, should be, and how they should be distributed, it is not for me to say. My present business is to draw attention to the fact that they involve associations; and that if the associations are to be established, and to have really guiding value, it is essential that they should be as direct and as uniform as possible. For the establishment of associations, it is of no use to reward or to punish a child some time after the event; nor is it of any use sometimes to punish and sometimes to let alone. If fire sometimes burnt the child's fingers and sometimes did nothing of the sort, a fixed association would never be established. And if the same action sometimes leads to punishment and at other times is winked at, all the associative value of the punishment is lost. Boys much prefer a master who is uniformly strict to one who is sometimes lenient and at other times exacting.

Enough has now been said to show how important is association in the education of the schoolroom as in the life of sense-experience. It may be well, however, before passing on to other forms of association, to point out that all the teacher can do in this matter is to afford to the child, boy or girl, opportunities for the establishment of associations. Mental development is an individual matter. Each must establish his own association-links for himself. No one can do this for him. The art of education is the art of

furnishing the best possible conditions for self-development.

Let us now pass on to consider briefly what is termed *association by similarity*. Personally I should prefer the phrase *suggestion by similarity*, or better still, *suggestion by resemblance*. A short time ago, while I was looking at Crook's Peak in Mendip from a certain point of view, I was suddenly reminded of the Corcovado Mountain on the Bay of Rio. There was sufficient resemblance between the two peaks for the one to suggest the other. The suggestion having once occurred, Crook's Peak having suggested Corcovado, the impression and idea became associated by contiguity, and thus the original suggestion was reinforced. Now, whenever I see Crook's Peak, the Corcovado is brought to mind. A great deal of this sort of thing must go on in the early development of sense-experience; and it is further enforced in the initial stages of education. The child is well acquainted with Spot, the family fox-terrier —calls it "'Pot," perhaps. It sees, out of doors, another terrier, bigger and without the great black patch round the left eye, but on the whole resembling Spot; and at once calls out "'Pot." As the child learns the use of words, the range and limits of suggestion by resemblance must be gradually brought home. Our nouns are, many of them, common names for a group of objects associated together in virtue of certain resemblances, and giving rise to generic ideas.

In teaching a child, we are constantly indicating differences and distinctions as well as similarities and resemblances. We teach him to group things together

in virtue of their general resemblances, and to distinguish within the group in virtue of particular differences. This buttercup is different from that daisy, but both are flowers; this dog is different from that cat, but both are animals; Mabel is different from Lucy, but both are girls; and so on in a great number of cases. This constant habit of comparing things begets a tendency in a quick-witted child to be on the lookout not only for resemblance, but also for contrast. And as this habit becomes more and more established with passing years and growing experience, there is an increasing tendency for things to suggest not only their likes but their opposites. To suggestion by resemblance is added *suggestion by contrast*. And when such contrasts have been suggested, they become associated by contiguity, and the subsequent suggestion is thus reinforced. The language of description constantly uses resemblance and contrast side by side, the one to enforce the other. The wing of the penguin, we say, is like the flipper of the seal, and very different from the wing of a swift or a seagull. The sea looked dull and gloomy, there was no life or brightness in the scene. *A* is slow, sure, and industrious, and quite unlike the brilliant but terribly idle *Z*. And so in a number of other similar cases, which will readily suggest themselves (by similarity).

When the child begins to perceive the relations of objects to each other, and begins to dissociate qualities from the things which, as we say, possess these qualities, something more than mere resemblance is suggested, namely, similarity of relationship. It might be well to reserve the phrase *suggestion by*

similarity for those cases which involve a similarity of relations, employing the phrase "suggestion by resemblance" for those cases in which there is an obvious likeness of objects of sense-experience to each other. Most cases of suggestion by contrast involve contrast of relations. And in those cases which were alluded to at the end of the last paragraph, where similarity and contrast are employed for descriptive or explanatory purposes, it is the relationships which are of specially suggestive import.

The language of the poet is full of suggestions by resemblance, similarity, and contrast. I will illustrate this by a few examples from Tennyson. Resemblance prompts such lines as,

> "A brow
> May-blossoms, and a cheek of apple-blossom."

> "And her hair
> In gloss and hue the chestnut, when the shell
> Divides threefold to show the fruit within."

But it is similarity of relations which is suggestive in

> "A rosebud set with little wilful thorns,
> And sweet as English air could make her."

There is more of similarity than resemblance in

> "A laugh,
> Ringing like proven golden coinage true."

So too in the question,

> "Was he not
> A full-cell'd honeycomb of eloquence,
> Stored from all flowers?"

The alternate cloud and sunshine of April suggest the comparison of the lines,

"And hopes and light regrets that come,
Make April of her tender eyes."

A somewhat similar thought occurs again in

"So sweetly gleam'd her eyes behind her tears,
Like sunlight on the plain behind a shower."

One or two more examples of analogies drawn from Nature must suffice.

"A doubtful throne is ice on summer seas."

This simile was no doubt suggested by the instability of the equilibrium of an iceberg melting in a warm current. The suggestiveness of flowers was always great and varied for Tennyson.

"Wearing the white flower of a blameless life."

"Wait, and Love himself will bring
The drooping flower of knowledge changed to fruit
Of wisdom."

My last example of such suggestions by similarity is a rather more complex one, in which an analogy is drawn between the forging of metal and the forging of character. It occurs *In Memoriam*—

"Life is not as idle ore,
But iron dug from central gloom,
And heated hot with burning fears,
And dipt in baths of hissing tears,
And batter'd with the shocks of doom
To shape and use."

By the man of science, as by the poet, suggestion by similarity, with occasional illustrative contrast, is constantly used in description and in explanation. The moon, we say, is continually falling towards the earth, as a stone falls towards the ground; or, the moon swings round the earth as a ball at the end of

a string swings round your hand. Just as the straight-falling raindrops seem to be slanting to a man who is driving rapidly in a dogcart, so do the rays of light from distant stars seem to change their direction as the earth whirls round in her orbital course. Just as the artificial selection of the gardener tends to the preservation of the strongest and most beautiful plants, so does the destruction of the weakly and imperfect, in the natural struggle for existence among organisms, tend to the survival of the strongest and healthiest. Just as, to give one more example, pressure will squeeze ice into the condition of water, because water *expands* on freezing, so will pressure squeeze molten rock into the solid condition because molten rock *contracts* on solidifying. This last example shows how a fairly simple process of reasoning is based on an insight into inverse similarity of relations.

It may, I think, be fairly said that, while suggestion directly due to association by contiguity is that which chiefly determines the sequence of ideas in the lower stages of mental development and during the earlier months or years of child-life, and while suggestion by resemblance follows thereon ; all the more subtle and delicate sequence of ideas in our adult life is due to suggestion through similarity or contrast.

We must now revert to association by contiguity that we may take note of a qualifying clause in our statement. If any two focal elements in consciousness, *c* and *l*, occur in successive moments of consciousness as impressions, the subsequent recurrence of *c* as impression or idea will tend *under similar*

marginal conditions, to suggest the recurrence of *l* as an idea. The clause to which we have now to direct our attention is that which is here italicized. In practical experience *c* has not only become associated with *l*, but also with *f*, *r*, and *y*. This was described as divergent association. The sound of the word "cat" is associated with the visual image of the animal, the visual image of the word, the pronunciation of the word, the writing of the word. The marginal conditions of the moment determine which of the divergent lines of association shall be followed. Under the marginal conditions of repeating what the teacher reads, the pronunciation of the word is suggested; under the marginal conditions of dictation, the writing of the word; under the marginal conditions of a walk in the garden, the visual image of the animal will probably be suggested. A great number of our words have divergent associations; and yet, when we meet them in their proper places in the sentence, we are seldom at fault in taking the particular suggestion intended by the author. This is because the whole sentence, and what has preceded it, creates the requisite marginal conditions. If we say, "Sauntering along the well-kept gravel walk, she admired the low, neatly-trimmed edging of box," few will misunderstand us, though the word "box" is one with many divergent associations. For young children, whose experience is necessarily limited, most words have only particular associations; and this is one cause of their apparent inattention. If the word "dog," for example, is at once suggestive of Spot, the family fox-terrier, directly that word occurs in the child's sentence, away flies the little

mind to the particular animal, and the reading lesson becomes hazily marginal. We all of us know how readily some chance expression of a speaker or preacher may suggest something of particular interest to us, and how our attention is thus diverted from what he is saying.

The relation of the focal impression or idea to the margin of consciousness gives rise to what is termed *simultaneous association,* or the association through contiguity of focus and margin. It is not, be it noted, an association of impressions and ideas, as we have defined these terms, but an association of the impression or idea with its marginal setting, or with some elements therein. Thus, we chance to meet a man of striking or peculiar appearance in the street. Subsequently we meet him at dinner; and the sight of his face suggests the marginal setting of the street scene in which on the former occasion he was focal. Or we are reading Tennyson in the open air, which is perfumed with the scent of gorse. Subsequently the scent of gorse suggests some passage which we were enjoying at the time. All that we have learned concerning the intimate relation of focus and margin in the state of consciousness will help us to appreciate the importance and the reality of this simultaneous association. It is through this association that focus and margin are so knit together that in the moments of recall they are jointly re-presented in the new marginal setting of that moment.

Furthermore, the relation of the focal impression or idea to the margin of consciousness is—or is a most important factor in—what we term *interest.* The interest may be a special one, arising out of what our

minds are occupied with at the time in question ; or it may be a general one, connected with our natural and habitual mental bias. *Attention* follows the line of interest ; and it is questionable whether we can attend, at any rate at all continuously, to that which possesses for us absolutely no interest. Hence, we must do our best to surround with some sort of interest that drudgery which is necessary for the establishment of useful associations.

It only remains, in concluding this chapter, to say a few words on the art of recollecting. Both remembering and recollecting are based on association. In remembering, association suggests, without effort, that of which we are thus reminded. But when we fail to remember, we must try to recollect. And while remembering is probably, as before stated, a natural gift which can scarcely if at all be improved, the art of recollecting is one which can be cultivated and very greatly improved. For this purpose the fact which we wish to recollect must be fitted in to some *system* and associated in that system by several divergent links. It must be somehow tacked on to our interests. If once a fact be well incorporated in a system which interests us, it has as good a chance of being recollected as we can give it. Of course, the more natural the system is, the better ; but any system is better than none. The very fact of consciously and of set purpose incorporating new facts in a system necessitates dwelling on them and attending to them, which facilitates their recollection at a future time. It is well also to form association-links with as many allied impressions as possible, such as sight, hearing, pronunciation, and writing ; and to

strengthen the linkage by repetition at intervals. This may be illustrated by a simple and a more complex example. We wish to fix in our memory where St. Alban's Head is. To do so, we must fit it into our system of geographical knowledge. This bold headland lies about midway between Swanage and Weymouth. We look it out in the map of Dorsetshire, and thus add a visual impression to reinforce the auditory impression and the motor impressions due to repeating the words. We thus establish a number of systems in divergent associations. In afterwards seeking to recollect, we use these divergent lines as convergent upon St. Alban's Head. It may be that we cannot recall whereabouts it was on the coast-line. But the thought of the map suggests Dorsetshire, and this gives a visual image of the coast-line; and Swanage-Weymouth shoots across the mind. Again: We wish to fix in memory that the tooth of a fish called Ceratodus is found in a certain geological stratum at Aust Cliff. We examine the tooth; pronounce, write, and look at the name "Ceratodus"; think of its derivation (*keras*, horn; *odous*, tooth); consider its appropriateness; think of the zoological nature of the fish and its relation to a similar fish now found in Queensland; look out Aust on the map; learn that the "old passage" of the Severn was here; get a geological section of the beds in the cliff, and perceive the relation of the bone-bed in which it is found to the other beds; and generally consider the geological relations of the particular stratum. In this way we wedge Ceratodus pretty securely into our system of knowledge, and link it by many lines of association with what we previously knew.

CHAPTER III

EXPERIENCE

The sequence of impressions in any series of moments of consciousness is directly due to the sequence of stimuli coming from external objects or from various parts of our own bodily organs. When we are out for a country walk, for example, the sights, sounds, scents of nature give rise to a number of impressions, while other impressions may be produced by the movements of our limbs, our free and quickened breathing, and the general glow of active life throughout our bodily frames. If we consider, not only the focal impressions, but the states of consciousness in their entirety—that is, including both focal and marginal elements—we find that the presentative impressions, such as the sight of field or flower or bird, the scent of the honeysuckle or the song of the lark, are set in a presentative background due to stimuli of the same kind as those which give rise to impressions, but less prominent and intense. The glow of healthy active life may not be specially attended to so as to be focal to consciousness; but it none the less affects the states of consciousness of which it forms a subordinate part.

On the other hand, when we have a sequence of

ideas—sitting perhaps in the twilight and letting our thoughts run their course without much interference from the intrusion of impressions—this sequence of ideas is due to suggestion by contiguity or by similarity. In the case of suggestion by contiguity the original linkage was one of direct sequence of impressions; but though every link of the chain was thus forged in presentative experience, the links are recombined in a new way; so that we may describe the reverie as a new chain of old links. But where suggestions by similarity arise, these may be wholly new; they are part of our individuality, and give originality to our thought. A similarity may strike us which has struck no one else. This forms part of what is called *imagination*. And just as in a sequence of impressions there is a background of presentative elements forming the margin of the states of consciousness, so too in a sequence of ideas there are a number of re-presentative elements filling in the background. These are not ideas, for they are not in the focus of consciousness; but they are of the same stuff of which ideas are constituted.

Practically we seldom or never have a sequence that is either altogether presentative or altogether representative. When we are out for the country walk, there are not only impressions but also ideas which they suggest; and the impressions and ideas follow each other in rapid sequence. The background, too, is not wholly presentative, it has re-presentative elements as well. In our twilight reverie we cannot altogether exclude impressions, while in the background, or marginal region of consciousness, there are sights, sounds, pressures and presentative elements

furnished by the immediate condition of our bodies. The states of consciousness are thus in either case very complex ; and this cannot be too fully realized. When we are dealing with impressions or ideas, we must remember that we are, so to speak, plucking the eyes out of our states of consciousness and examining them separately. The natural position of the eye is in the body. And the natural position of the impression or the idea is in the body of the state of consciousness. We analyze the state of consciousness. and thus reach the impression or the idea as the result of our analysis. We must not forget, however, that, as we actually experience it, the impression or the idea is only part of a state of consciousness.

Now, with regard to experience, the first thing that is tolerably clear and obvious is that it is a matter of impressions and the directly presentative elements in consciousness. For every sense-idea we must have had direct experience of its corresponding sense-impression ; for every motor idea, a motor impression ; for every idea of relation, a basis in practical experience. It is true that the reach of our thought exceeds the range of our experience ; it is true that, through imagination, we recombine our experience in new modes ; this does, however, but emphasize the fact that the experience itself is a matter of direct acquaintance with what is immediately presented to consciousness. Even our higher flights of thought and imagination, if they have no basis in experience, are of little worth. It is one of the aims of education to furnish the conditions for the acquisition of a solid basis of experience. The second point to be noticed is that the practical value of experience is to afford

the requisite data for the guidance of action and conduct; while one of the aims of action and conduct is to extend and establish the experience already gained.

Our bodies are so formed that we actively respond to certain stimuli. A tickling of the feet causes the withdrawal of the leg, a slight irritation of the delicate membrane of the nose gives rise to a sneeze. If, when a child a few months old is looking at your face, a bright object appear in the marginal region of its field of vision, the eyes are drawn away from your face to make the bright object focal. Such active responses to stimuli are called *reflex actions*. They are also often spoken of as *automatic*, though the word is not always used in this sense. The ability to respond in these ways is a portion of our natural inheritance, and forms part of the first raw material of experience. Automatism is thus the primary factor in our active life. The secondary factor is *control*; and this control is rendered possible of practical application through association and what is termed correlation. By control is meant the conscious guidance of our actions in the light of previous experience. If, to take an example previously given, the sight of steaming porridge is associated with burning one's tongue, control can be exercised over one's action in the future, and unpleasant consequences may be avoided. In the early months of life we are constantly making new experiments in the putting forth of our inherited powers of activity. We select the successful and satisfactory modes of action for repetition, and hold in check those which are unsuccessful or lead to unpleasant or painful results.

The growth of experience envolves a continual *correlation of the data afforded by sensation.* By this expression it is meant that the impressions and ideas and the marginal data of the special senses, together with those derived from the parts concerned in the movements of our bodily organs, are brought into such relation to each other as to have suggestive value. If, when a child is gazing about here and there, a sweet is brought within his range of vision, so soon as it falls within the margin of the visual field, the eyes are so moved as to bring it to the focus of vision ; the hand is then stretched out to touch and seize it, and it is conveyed to the mouth. This involves a correlation of the data afforded by the special senses, sight, touch, and taste ; and a further correlation of these with the sensory data afforded by the movements of the eyes, the hand and arm, and the mouth. The stimulus in the margin of the visual field leads to the movements of the eyes necessary to render the sweet focal in vision ; the impression so produced suggests the ideas of the movements of hand and arm which will enable the child to grasp the sweet ; ideas of taste are at the same time suggested ; and these ideas of movement and of taste are followed by their corresponding impressions as the actions are carried out and the sweet taken into the mouth.

When we are regarding the matter from the point of view of the acquisition and organizing of experience, we speak of the *correlation* of the data afforded by the special senses among each other, and with those due to movements. But when we regard the matter from the point of view of the putting forth of the activities, we speak of the *co-ordination* of these

activities. All matters of *skill* in the use of our bodily organs involve this co-ordination. A very great number of muscles are concerned in what we are wont to regard as comparatively simple activities, such as walking or speaking. All these muscles have to be called into play in due degree and with nicely balanced activity. We are not, however, conscious of the details of this process, which is, in fact, a physiological one. What we are conscious of is the net result of the process. We are conscious, that is to say, of the activity as a whole, not of the individual play of all the muscles which bring about the activity. And the method of acquiring skill in the co-ordination of activities is that of trial and error ; the selecting of the successful results for repetition, and the checking of the unsuccessful results. This is clearly a matter of control. Indeed we may say that control is primarily exercised over our bodily activities in the guidance of our life of free movement. Nice and accurate co-ordination is the outcome of nice and accurate correlation of the data afforded by experience.

Let us now take one or two more examples of correlation. Suppose that we were blind and deaf; then, so far as our active life was concerned, we should be almost entirely limited to a correlation of the data afforded by touch and pressure among themselves, and with the data afforded to consciousness by the movements of our limbs. As we felt our way about the world, touches or pressures in various parts of our bodies would be correctly localized, and associations would be formed between such experiences and the movements of our limbs. The hands, and especially the finger tips, are the central organs

of touch. If, as we felt about the table, something came in contact with our arm, we should at once bring the hand and fingers to bear upon it, that we might feel out what it was ; as indeed we all do when we are feeling for something in the dark. Thus we should organize what is called a field of touch.

Now, suppose that to the sense of touch we add the sense of sight. This enables us to feel about us, so to speak, in a wider field. First of all, there is a correlation between visual data and the sensations of movement in the eyes. The field of vision becomes most delicately and accurately organized, so that, if any visual object appears in the margin of that field, we can at once move the eyes in such a way as to make the object focal. And this involves, not merely common movements of the two eyes in their sockets, but movements of convergence of the two eyes, and movements inside the eyes, which are necessary for the accommodation of vision to various distances. Hold a pencil-point about ten inches from the eyes, and alternately fix them upon this point and on some distant point on the wall or out of doors. You will feel the movements of convergence and accommodation as you pass from one to the other. The visual experience of seeing an object at a given distance is due to a combination of visual sensations and motor sensations in the eyes and their sockets. Such an intimate coalescence of diverse sensations to produce an impression is a good example of what is termed mental *synthesis*. The product of the synthesis—which is a natural and involuntary process, not one that is intentional and voluntary—has not, for practical experience, any reference to motor sensations.

The motor sensations of convergence and accommodation are not recognized as such, but make us aware that the object of vision is situated out there at a certain distance from us. And so completely do these motor sensations coalesce with the visual sensations in the impression, that very few of us are acquainted with the fact that the sense of distance in vision is due to motor elements in consciousness.

The distance element in vision is, however, correlated with other motor elements. The child who sees a sweet on the table before him, reaches out his hand to take it up. Visual distance at once suggests distance for touch. And if the object is farther off, so that he has to go to it in order to reach it, visual distance is correlated with distance for locomotion. Thus the field of vision and the fields of touch and of free movement are correlated. Furthermore, as we stretch out our hand to seize an object within our reach, we see it cross the field of vision; and a correlation is established between the movements of our limbs, as seen, and the same movements, as given in motor sensation. Again, if we fix our eyes upon some object and then move our hand in front of our face, still keeping the eyes fixed, we see the hand cross the field of vision from margin to margin; and if then, releasing our eyes from the object on which they have been fixed, we allow them to follow the movements of the hand, we experience a series of motor sensations as the eyes follow the hand. In the one case the movement is a change of the position of an object in the field of vision; in the other case it is a change of position in the organs of vision. Or, take another example. As I write, the rooks are re-

turning to their nests and flying westwards past my window. I fix my eyes on the corner of the opposite house, and rook after rook enters and crosses the margin of my visual field. My eyes remain fixed all the time. But now I fix my eyes upon a certain rook and follow him across the sky, keeping him steadily in focus. As I do so, the house and trees opposite and the clouds in the sky seem to drift across my visual field as my eyes move, following the bird. Thus, when my eyes are fixed there is a real movement of the external object, the rook, across the field of vision; and when my eyes follow the rook there is (1) a real movement of the eyes, and (2) an apparent movement of the fixed objects round me, the house, trees, and clouds. All these changes in the field of vision and movements of the eyes have to be correlated. When our bodies as a whole are also in movement, further correlations are necessary. These are soon completely established for our ordinary movements of walking and running; but for unusual movements the correlation is often imperfect. I traveled in the train a short time ago with a child who was making her first railway journey. "What makes all the things move so fast?" she said to her mother.

Besides the correlations we have been considering, there are further correlations of the data afforded by sight, touch, and movements of eyes and limbs, with the data afforded by the sense of hearing, the sense of smell, our temperature senses, and that sense of direction to which allusion was made in considering the impressions of sense. Smell is correlated with taste; and such visual effects as that produced by

steaming porridge are correlated with the effects of eating it too hastily. All these correlations in the special fields of touch, sight, hearing, smell, both in each field severally and of the fields each with the other, gradually coalesce and become organized into what we may term the general *field of experience.*

It is probably difficult for us to realize what a chaotic muddle of sensations there must be in the infant's mind during the early weeks and months of its life. The exact steps and stages of the correlation in the child-mind we shall probably never know with anything like certainty. Few of us remember anything which occurred to us before we were about two years old, and by that time the field of experience is pretty well organized, and all the simpler correlations have been established. There are good grounds for believing that *each individual has to establish all the correlations for himself.* They are not inherited, but must be acquired. Co-ordinations of motor activity are inherited; but the correlations of sensory data are probably, I repeat, not inherited, but have to be individually acquired. And there is but little that we can do in the way of direct teaching to aid the infant and child in the acquisition of this elementary but most important experience. All that we can do is to afford to him the best and most convenient opportunities and conditions for the work of self-development.

It will perhaps have been noticed that I have constantly spoken of the correlation of sensory data, and not of the correlation of impressions and ideas. I have done so because a good deal of the correlation takes place in the margin of consciousness, and is not

by any means confined to the focal region, which is the special seat of impressions and ideas. Indeed, it is somewhat remarkable that very much of the correlation is established subconsciously. Probably only a very small proportion of the correlation which becomes so well organized in the growing experience of the child have been formed intentionally. The infant does not apply itself to the task of correlating the sensory data which are hour by hour and day by day accumulating. The organization of experience is a process of natural growth, like that of the plant, which puts forth its shoots, leaves, and buds, and develops into a beautifully symmetrical tree ; or like that of the child's own body, in which the limbs and all the organs develop in due relation to each other. While, therefore, it is probably true that, as was stated in the last paragraph, the correlations of sensory data are not inherited, but have to be individually acquired, it is none the less true that it is part of the inherent and inherited tendencies of our mental nature to form such correlations if the necessary data are duly supplied. There is no evidence that this, that, or the other correlation is inherited ; but it is unquestionably true that the faculty for correlation is an inalienable mental possession. The sensory data of experience are the food of the mind ; each individual has to find or to be supplied with his own food ; but the power of dealing with the food, so as to build with it an organized and correlated body of experience—that is part of our dower as human beings.

A great deal of this organizing and correlation is carried on subconsciously, in what I have termed the

margin of consciousness. The correlation, indeed, affects the whole field of consciousness, and is in no small degree a matter of the relation of focus to margin, and of marginal elements among themselves. Many simultaneous effects in consciousness of changes in the visual field, movements of the eyes, and movements of the hand, are duly correlated when the child reaches forth its hand to seize a sweet.

We have seen that the co-ordination of motor activities is founded on innate and inherited automatism, but that it is brought under control in accordance with the data afforded by association and correlation, and is guided to desired ends in the light of past experience. The guidance and control are an expression of the individual *will*. Experience tells us that certain states of consciousness, or certain elements in consciousness, are pleasurable, agreeable, or in harmony with our mental nature ; while others are painful, disagreeable, or discordant with our mental nature. We seek the repetition of the former ; we shun or avoid the repetition of the latter. And this seeking or shunning is rendered possible through correlation, which has brought our activities into close touch with our sensory experience. Without such correlation the exercise of the will would, it is evident, be inoperative. As it is, through the correlations which have been established, control through the application of the will can be exercised over those particular activities which are immediately concerned in reaching or avoiding pleasant or disagreeable results. But here again we must notice that the activities themselves over which control is exercised do not, as a rule, occupy the focus of con-

sciousness at the moment of control ; it is rather the end to be gained, or the result to be avoided, to which we attend. When the child stretches forth his hand to seize the sweet, it is the sweet itself which is in the focus of consciousness ; the means by which it is to be obtained is of merely subconscious value. When the child whose tongue has been burned with porridge holds in check the action of putting the spoon to his mouth, it is the avoidance of scalding his lips that is focal to consciousness. And yet in both these cases the control is really exercised over the motor activities concerned. This does but enforce that which has before been pointed out, namely, that we must deal with states of consciousness as wholes, and not merely pay attention to their focal elements. For we saw that, unless we take into consideration the marginal elements in consciousness, we cannot say why one rather than another of several divergent associations is suggested by such a word as " box "when it occurs in a sentence.

It is, however, undoubtedly a fact that many things which in the first instance require the application of our focal attention, come with practice to be performed subconsciously. Take, for example, the case of singing. The child has at first to attend carefully to the way in which a certain note has to be produced by the voice, and to the changes which are necessary in order to sing the intervals in a simple tune. But after a while the tune can be hummed while the mind is occupied with quite different matters. And yet even here it is the effect of the motor activities on which the attention is fixed rather than on the motor activities themselves. The child hardly knows,

if he knows at all, that it is on the movements of the larynx that his efforts to control the voice are exercised. Or, take the case of a boy learning to ride a bicycle. It requires, in the early stages of the process, all his attention to guide the machine and prevent a fall; after a while, however, he can spin along, talking to or listening to his companion, and paying no special attention to the machine, which he is all the while guiding skilfully. But here again it is rather the effects of the movements of his hands and arms than the movements themselves, on which his attention is fixed while he is acquiring the necessary skill.

The lad talking to his companion as he spins along on his bicycle, affords indeed a good example of correlation. The conversation involves the correlation of the field of hearing, within which both his own and his companion's words fall, with that field of motor effort which we may term the field of speech. At the same time, the field of vision and certain data afforded thereby, such as occasional stones on the road, are correlated with the field of muscular effort involved in riding the machine; and within this latter field there is a constant correlation between the incoming sensory data from legs and arms whose diverse work must co-operate to attain a common end. All this correlation is effected simultaneously, and yet in the midst of it all the boy is not insensible to the view, has a dim sense of a healthy and growing appetite, and perhaps has a lurking notion, somewhere at the back of his mind, that instead of enjoying this ride he ought to be working at his verse-task. If all this is not, strictly speaking, simul-

taneously present to consciousness—and much of it does undoubtedly co-exist at the same moment—it is none the less rolling through the mind with a complexity which is rendered orderly only through correlation.

In the common phraseology of ordinary conversation, we should perhaps speak of the guiding of the machine under such circumstances as performed automatically. It is clear, however, that such automatism is not quite the same as that to which allusion has already been made. The automatism we then spoke of was an innate and inherited co-ordination of motor responses, like that which enables a baby to perform the very complex operation of sneezing. It is quite certain that we do not inherit an automatic co-ordination of the motor activities involved in riding a bicycle. When we speak of the exercise of skill in this matter, or in any such cases, as automatic, we mean that the constant guidance and control which was requisite at first is no longer necessary. Practice has made perfect, and the management of the machine is so much a matter of *habit* that it can be performed, if not unconsciously, at any rate quite subconsciously. This automatism, which is the result of practice and habitual performance, is called *secondary automatism*. It is obviously a great advantage for the conduct of our life's activities that we should thus be able to establish co-ordinations which are secondarily automatic, the due performance of which may be left with perfect confidence to the margin of our consciousness while our focal attention is otherwise occupied.

We must not fail to remember, however, that com-

plex correlations, which are to us so natural that we never trouble our heads about them, are for the little child matters the difficulties of which have not yet been overcome ; and that complex co-ordinations which have, for us, passed so completely into the secondarily automatic class that they may be left for subconsciousness to afford the little guidance that is necessary, still require for the child the practice which will eventually render perfect. Hence, it is of some importance that the teacher of young children should understand the conditions of mental development, in order that she may so far enter into the nature of the child-mind as to appreciate and make due allowances for difficulties due to its immaturity. "Put yourself in his place," is a good motto, but it is not easy of application in the education of little children.

Now, a great deal of early education is concerned with the imparting of skill. And I think it is no exaggeration to say that, so far as this is concerned, an ounce of demonstration is worth many pounds of description. We build here upon the natural faculty of imitation. We must show the child how a skilled action is to be performed, and get him to imitate what we do. Fortunately, children are for the most part very observant and very ready to imitate. It is surprising what rapid progress they often make in the acquisition of skill.

And I think it is difficult to exaggerate the importance of a varied training in skill. It is indeed, in my opinion, of primary importance in the early stages of education and for some time onwards. Nor should it at any time during the preparatory

years of life be neglected. Involving as it does the constant correlation of the data of sense, and the nice co-ordination of motor activities; essentially practical and in close touch with real things; fostering habits alike of close observation and of accuracy of performance; based upon an elementary exercise of the will in the guidance of action; necessitating the steady application of means to a definite end in view; lending itself admirably to an elementary appreciation of beauty, and fostering a desire for its attainment;—on all these grounds the kindergarten should form a prominent feature in our educational system.

For the training of the finger muscles, Slöjd, drawing, and the playing of a musical instrument—best of all, if there is a good ear for music, the violin—are admirable. The wider and more varied the training the better; for our object is to give to the fingers a skill which may eventually be applied to anything, from tying a knot or a white tie or sewing on a button, to the most delicate touches of art on the one hand to the equally delicate touches of scientific manipulation on the other. Whenever I find a student who displays unusual delicacy of dissection in comparative anatomy, I inquire how he or she has trained the finger muscles so as to have them so well under control. Often I receive for answer, that they have not been specially trained in any way. But, on further inquiry, I nearly always get such answers as, "Oh yes, I'm fond of drawing—just sketching things that strike me, without any knowledge of the subject"; or, "Well, I've always been rather given to carving boats, and the knobs of sticks, and odd things, but I never learned to do so." No doubt

such answers indicate a natural gift which has found expression in these ways; no doubt there may be some whose fingers are by nature "all thumbs"; but I believe, if these "thumbs" are only trained at a sufficiently early and plastic stage of development, they will, in nine cases out of ten, turn out to be very respectable fingers.

Nor must we despise the value of this delicacy of skill in its application to much that is highest in human endeavor. In many departments both of art and science, skill is essential as the medium of expression of that which takes form in the mind of the artist or man of science. In painting, technique may be inferior in worth to inspiration; but of what value to mankind is the inspiration of the painter if his skill in technique is inadequate to embody his ideal? What do we not owe to the marvellous interpretative skill of such a pianist as Paderewski? How much of the value of anatomy and surgery to man would remain if we failed to include the marvellous skill in their application which characterizes a great operator? Of physical science it is scarcely too much to say that it owes its present position to the application of skill, to the making of delicate apparatus, and the execution of experiments of extreme nicety. Skill in the manufacture and skill in the use of the microscope have done much to make biology what it now is. In a word, skill is the faithful and unwearied handmaiden which ministers both to science and to art.

For the training of the larger, coarser body muscles, Swedish drill, the gymnasium, dancing, and games are of the utmost value. What our national

games have done for the English race it is difficult to overestimate. They train us to use our bodies in the most efficient manner, and to expend our energies to the best advantage. It is impossible to watch the organized games, musical drill, and other exercises of the kindergarten, without being impressed with the value of the training in what may be termed social co-ordination. An old soldier standing by my side on such an occasion said to me, "That's the training for our future soldiers and sailors." A good football team, a good eleven, a good eight, work together for a common aim, and learn to combine their skill with due co-ordination and due subordination. The playing-fields are the finest school of organized co-operation in the world.

In all these matters of skill what is learnt is essentially real and practical. They depend on direct experience; second-hand information is of little or no value. We have here a form of education which is in close touch with the realities of that with which it deals. I have heard intellectual people speak of it as "mere physical training." But I am anxious that it should be quite clearly understood that this "mere physical training" involves a training in mental qualities which are, whatever may be the position assigned to them in the mental hierarchy, of an eminently serviceable character. Quickness and sureness of eye, swiftness and accuracy of response, are qualities which are mental as well as physical, and which enable a man to deal successfully with many of the practical difficulties of life; while the habit of working with his companions for a common object, and contending with others in friendly contest, gives

him a practical knowledge of character and a power of dealing with his fellow-men which are invaluable.

Let me now say a few words in brief summary of what we have so far learnt. We have grasped, I trust, that a state of consciousness, regarded as a whole, is by no means simple, but is made up of a number of psychical elements which co-exist together and are of various degrees of intensity. These elements are either presentative, that is to say, directly due to stimuli from without or from parts of our bodies, or re-presentative, that is to say, reproductions of the presentative elements. The most prominent or focal of these elements are what we termed impressions when they are presentative, and ideas when they are re-presentative. Ideas are suggested to the mind in virtue of association by contiguity, or through resemblance and similarity. But in any case the impression, or the idea, which is in the focus of consciousness, does not stand alone. It is set in a background of marginal elements of both the presentative and the re-presentative order. Only by neglecting this background, for the purposes of our study, can we consider impressions or ideas by themselves. For the purposes of our study, that is to say, we isolate the impressions and ideas, and distinguish them from their natural margin. But in practical experience the margin is always exercising a subtle but none the less important influence on the focus. Hence the actual sequence of our ideas is in part due to suggestion through association or similarity, and in part due to the influence of the margin. In other

words, the idea which is focal in any state of consciousness is a product of the preceding state of consciousness as a whole, focus and margin contributing to the effect.

As a great number of sensory data are constantly pouring in upon the mind, partly from the special senses, partly from the organs of our bodies which are concerned in motor activity, it is necessary that they should be brought into relation to each other and duly marshalled and organized. This is the work of practical experience, and is termed correlation. It affects the whole field of consciousness, and is largely a matter which concerns the marginal region. It is, however, also, in an important degree, a bringing of the focus and the margin into due relation to each other, so that this subconscious margin becomes subordinate and ministrant to the more imperious affairs of the focus.

If, instead of considering the development from the point of view of experience and the correlation of sensory data, we regard it from the standpoint of the organization and perfecting of the bodily activities, we speak of co-ordination. We come into the world with bodies the organs of which are already automatically performing co-ordinated activities (as in the case of the heart and breathing apparatus), or are ready to perform them automatically on the application of the appropriate stimulus (sneezing, sucking). It is part of the business of development to bring the activities under fuller and fuller guidance and control, thus organizing in the light of experience the raw materials of co-ordination which we inherit. But when the guidance is constantly and

steadily exercised in certain directions, habits of action are established ; fully conscious guidance may then be withdrawn, and the activities left to subconscious guidance in the margin of consciousness. The activities become secondarily automatic.

A very important part of our education is, as we have seen, concerned with the correlation of sensory data and the co-ordination of motor activities. We may call this *education in the matter of practical experience.*

CHAPTER IV

PERCEPTION

The process of correlation considered in the last chapter involves the bringing into relation, for the practical purposes of daily life, of the diverse data afforded by the several special senses, together with those afforded by the organs which are concerned in bodily movement and activity. Now this process, though it is certainly accompanied by consciousness, is not a voluntary one. It is not one performed with the end and object of correlation consciously in view. The relations, as such, do not come into focus at all. We utilize the correlations, but we do not attend to them. The correlations themselves would seem indeed so be throughout subconscious, our attention being fixed on their effects or their net results. In illustration of this, I would again adduce the case of the control of the voice in singing. For the attainment of this end, certain auditory data have to be correlated with the data afforded by the larynx and the parts of the mouth. And yet few of us are aware while some might even deny, that such correlations are necessary. So too, in pronouncing our commonest words. Probably not many of my readers could state, without first making special observations directed to

that end, the co-ordinations which are necessary for the pronunciation of the words "fall out." Try to do so yourself. This will lead you to pay attention to them, to note the movements of the mouth organs, the modifications of respirations. All of these have to be nicely adjusted through the correlation of the sensory data from the various organs concerned. When we are learning to speak or to sing, we proceed on the method of imitation, of trial and error. A particular sound has to be produced. We try, and fail; try again, and are less unsuccessful; try yet again, and at length succeed. The nature of the correlations involved in attaining this success does not enter the field of focal and distinct consciousness. We are concerned with the effects produced, not with the means of producing them.

To do a thing, and to know how you do it, are two very different things. Ask a boy how he manages that clever back-stroke at lawn-tennis. He cannot tell you; he does not know. He has no idea how he learned to do it. He supposes it is practice. But he will show you how he does it with much pride and pleasure. The feat of skill requires a wonderfully nice and accurate co-ordination of activities, involving I know not how many muscles in various parts of the body: the sensations which accompany this co-ordination are correlated, and afford the data requisite for the maintenance of control over the activities in question. But what the co-ordinations are, the boy does not know, and probably does not care. They have been established subconsciously and are utilized subconsciously; and knowledge is a matter not of subconscious effects, but of that which is focal

and definite to consciousness. It may perhaps be said that the correlations requisite for the performance of a feat of skill are not subconscious, but are unconscious; that the whole matter is one of mere bodily mechanism, and not psychological at all. Two replies may be given to such an assertion: a general reply and a special reply. The general reply is, that in so far as the skilled activity is a feat performed under guidance and control, the requisite data for such guidance must have been present to consciousness. It can hardly be maintained that the boy who makes the clever backhand stroke at lawn-tennis is a mere automaton; his feat is the result of experience gained by frequent practice; and unconscious experience is a contradiction in terms. The special reply is that, if you attend to the matter, you will be able to a large extent to make the subconscious correlations focal to consciousness. Then you will be able not only to perform the feat of skill, but to know, and to some extent to describe, how you do it.

When, in this way, we pay special attention to the details of the way which our minds act, we are exercising *introspection*. Introspection is looking within at the workings of our own consciousness. It is absolutely necessary in psychology. I would beg my readers to exercise themselves in the art of introspection, and to observe narrowly the sensory data that accompany the performance of skilled activities. It may not be easy at first. Not improbably it is a new field of observation and investigation. But it is an interesting field, and for the teacher one that is worthy of thorough and careful survey. And for-

tunately it is one that is always close at hand. The student of other branches of scientific investigation has to seek and collect the materials for his study. The psychologist carries with him his material wherever he goes.

Such introspection soon makes us acquainted with the distinction between the subjective and the objective aspect of experience. The distinction is rather a difficult one to grasp quite clearly and distinctly; but it is worth while to take some trouble to make oneself familiar with these two ways of dealing with states of consciousness. And here let me say that in no study is it more essential to check by a direct appeal to your own experience all the statements which you are asked to accept, than it is in psychology. You have always your own experience at hand for purposes of thus checking what is asserted. But remember that, if you are unable to indorse the statement, this may be due, either to the fact that the statement is erroneous, or to the fact that you are still inexperienced in introspection. In either case put some mark opposite the statement, and endeavor again and again to check it by an appeal to your own experience. Do not accept it unless self-observation convinces you of its truth; but do not reject it until you are quite sure that your own experience not only does not support it, but actually contradicts it.

Let us now try and get at the meaning of these terms, *objective* and *subjective*. Looking up from my page, I see, against the blue background of the summer sky, the swifts wheeling in their flight. That is a bit of practical experience. In its objective aspect

there are the birds at a certain distance from me, moving across the sky. No doubt it is I who am observing them; but I take that fact for granted. And it is with this objective aspect that we are usually concerned in the ordinary course of our daily life. But now let us turn to the other or subjective aspect. I, the observer, am experiencing certain sensations, which somehow combine together to give rise to what I describe as a swift in motion out there in the sky. If I consider the bird in its flight, I am considering the objective aspect; if I consider my own impressions and states of consciousness, I am considering the subjective aspect. It requires no introspection to see the swifts wheeling in the summer sky, but I have to look within to get at the subjective aspect of the experience.

Note that what we have done here is to analyze the bit of practical experience. The subjective and the objective are the different aspects of *the same* piece of experience; and it is only in analysis that we distinguish the one from the other. The little child and the farmer's lad do not trouble themselves about the analysis, and probably know nothing of object and subject. And yet the words they use when they say, "I see a swift," imply the analysis into the subject "I" and the object "swift." But they also imply that both are co-operating at the moment of experience. If the swift were not there, I should not see it; nor should I see it if I were not there. The swift and I, object and subject, must conspire to give rise to the bit of experience. What we habitually do is to pay attention to the objective aspect and take the subjective aspect for granted. It is the aim of

psychology, however, to direct special attention to the subjective aspect and to learn all that we can about it.

Two remarks may here be made before we pass on. First, Distinguish carefully between the subject as used in psychology, and the subject as used in parsing and the analysis of sentences. *The subject in psychology is that which experiences: the object is that which is experienced.* Secondly, Extend your idea of the object from the swift, which has been taken as a particular example, to anything which may be experienced. The swift is an object of sight, my pen an object of touch, the movement of my fingers an object of motor sensation, and a vast number of things objects of sense-experience. But a difficult problem may be an object of thought, virtue an object of desire, my father an object of reverence; and in like manner we may have objects of all the modes and varieties of human experience. Hitherto we have chiefly dealt with sense-experience; but we shall have to learn that experience includes far more than the domain of sense.

We will now proceed to consider certain objects of perception. First, we must inquire what is perception. What do we mean by perceiving? What is it that we perceive? The word "perceive" is often used in ordinary conversation in several somewhat different senses. In psychology it is employed as a technical term—that is to say, as a term that is used with a special meaning. But, unfortunately, all psychologists do not employ it in quite the same sense. I shall use it for that mode of experience by which we become acquainted with relations. We perceive

relations ; or, otherwise put, relations are the objects of perception.

What, then, are relations ? I see yonder swift in the sky ; and I perceive its distance from the ground. I see, too, a martin ; and perceive that it is a smaller bird than the swift. In these sentences it should be noted that I am using the word " to see " in a general and not in a technical sense ; and in this sense it is not necessarily antithetical to perception. What perception does, indeed, is to single out a particular element in the act of seeing. We may see the bird set in a background of many relations ; perception singles out one of these and focusses it definitely. Again, I taste a couple of strawberries ; and I perceive that the one is sweeter than the other. I hear two notes struck on the piano ; and I perceive that the interval between them is a major third, I see a butterfly ; and perceive that it has lost a portion of one wing. Observe that in all these cases we have two impressions, or an impression and an idea ; and what is perceived is the relation of one to the other : of the swift to the martin ; of the one strawberry to the other ; of the one note to that which preceded it ; of the maimed butterfly to the generic idea of the perfect insect. Observe, too, that what we focus our attention on in the act of perception is not the related impressions, but the relation which they bear to each other. We focus our attention first on the swift, next on the martin, and then on the size-relation of the one to the other ; first on the one note, next on the other note, and then on their relation in the musical scale.

In speaking of the relative sizes of two birds, the

relative sweetness of two strawberries, and the relative pitch of two notes, I have been drawing your attention to the objective aspect of the act of perceiving. The relative size, the relative sweetness, the relative pitch, are the objects of perception. And what about the subjective aspect? What do we learn about the matter by introspection? Let us take the case of perceiving the interval between two musical notes. When we hear the first note we experience an auditory impression; when we hear the second note we experience another auditory impression; but what do we actually experience when we perceive the relation of pitch between the two notes? We experience a *transition of consciousness* from one to the other. This transition in consciousness is the subjective aspect of that which in its objective aspect we call a relation. Two pieces of metal lie before us: we wish to perceive their relative weights. We poise first one of them in the hand and experience a particular impression; next, the other of them in the same way and experience another impression: we then say that the second is objectively heavier, and introspection tells us that the transition in consciousness was from a lesser impression to a greater. But so habitually do we attend to the objective aspect of our experience, that few people know anything about the subjective aspect.

To become acquainted with the subjective aspect of the act of perception requires introspection, or looking within at the workings of our own consciousness. But both in the objective and in the subjective aspect, retrospection, or looking back on our experience, is required. To perceive the interval between two notes,

we must hear first the one, next the other, and then perceive what the interval between them *was*. We must look back upon our experience. Such looking back is a very simple case of *reflection*. And without this very elementary and simple exercise of reflection, the perception of relations is impossible. So, too, subjectively. If in its subjective aspect the relation is experienced as a transition in consciousness, it is quite clear that the transition must be completed before it can be an object of introspection. Consciousness has, so to speak, made a little journey from one impression to another ; and it is only on reaching our destination that we can say anything about the journey as a whole. Then we can look back upon it and make it an object of reflection.

I have spoken of the transition in consciousness as the subjective aspect of the relation ; and yet, just now, I said that the transition must be completed before it can be an object of introspection. Is there not some confusion here ? First, I call the transition the subjective aspect of the relation, and then I speak of it as an object of introspection. It is puzzling, no doubt ; but the puzzle is inevitable. The only way to remove the difficulty is clearly to understand its nature. Everything that we know must, in becoming known to us, be an object of knowledge. If, then, we are to know anything concerning the subjective aspect of our conscious experience, it must be made an object of knowledge. The subjective aspect of one moment's experience must be made the object of a succeeding moment's introspective experience. Introspection always deals with past experience. It may be the experience of only a moment ago ; but

still it is the experience not of the "now," but of the "just now." One may illustrate this by a rough analogy. We can never see what is behind us ; no matter how quickly we turn round, we only see what was behind us a moment ago, before we turned. So we can never know—that is to say, we can never make the object of knowledge—what *is* the subjective aspect of our experience ; we can only know, through reflection, what *was* the subjective aspect before we reflectively turned round to examine it. Introspection is thus always retrospection ; or, in other words, introspection is always reflective.

Remember that in the ordinary course of our daily experience we do not trouble about analyzing it into an objective aspect and a subjective aspect. From morning to night we may have a series of states of consciousness in accordance with which our actions are guided ; and we may never think of analyzing any one item of the experience. The little child not only does not, but probably could not, analyze. We have spoken of this simple, naïve, unanalyzed phase of conscious existence as *sense-experience*. It has also been termed *consentience*. In such sense-experience there is neither subject nor object ; these two aspects of the experience are not yet distinguished in analysis. There need not be, and probably in the case of the little child there is not, any perception, in the sense in which we are using this word. The relations as such may never be focussed by the child through an act of perception. For it is quite sufficient for practical purposes in the life of sense-experience that the relations (not yet definitely perceived as such, or rendered focal to consciousness) should be subcon-

sciously *sensed.* We are subconsciously aware of, or *sense* (if we may, as before suggested, use this word as a verb), the movements of our eyes and our limbs, and are practically guided by the sensations in our actions, without turning the focus of consciousness upon them. We experience our states of consciousness as wholes long before we analyze them and perceive the relations of their constituent elements or factors to each other. Sense-experience thus supplies us with a large body of raw material upon which to exercise the higher faculties of the mind.

We will now follow up the subject of perception a little farther. What we perceive, in the first instance, is the relation between impressions. And, to begin with, we deal with qualitative relations between impressions of the same order. We teach the child, for example, to perceive the relations between colors —the relation of blue to green, of green to yellow, of yellow to red, of red to purple, of purple to violet, of violet to blue. The transition in consciousness from red to blue is quite different from the transition from blue to green. Associations are all the while being formed between the visual impressions and the names by which we symbolize them. Again, we help the child to perceive the relations between different sounds—the sounds of nature, the tones and inflections of the voice, the consonantal and vowel sounds employed in language, the different notes in music, and the differences in timbre in different musical instruments. Here, too, a great deal of incidental association is introduced, for since sound is so important a medium of intercommunication, and since so much depends on tone and inflection of the voice, the per-

ception of relation among sounds naturally goes hand in hand with, first the establishment of, and then the perception of, the suggestive relation through association.

We thus lead the child to perceive the relations between impressions of the same order—sights, for example, among each other, and sounds among each other. Gradually there comes the perception of the two fundamental relations of similarity and dissimilarity. Two blues, two reds, two voice-sounds, two musical notes, are similar to each other ; red and blue, voice-sound and violin-sound, are dissimilar to each other. And gradually, too, there comes the perception of similarity with difference. Two violin-sounds or two voice-sounds are similar in quality but different in pitch ; or the voice-sound and the violin-sound may be similar in pitch but different in quality ; or, yet more generally, the impressions produced by voice and violin are similar in being auditory impressions, and altogether different in character from those impressions which we term visual, olfactory, or motor. Thus the foundations of grouping or classification are laid, and the power of perceiving similarity and difference is quickened.

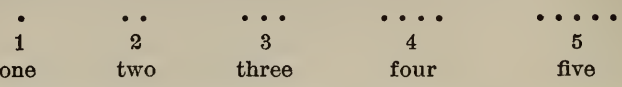
So far we have been considering qualitative differences, and these fall under two heads—first, the more general and broader differences between impressions of different groups, auditory, olfactory, motor, and so forth ; the complete difference, for example, between the scent of a violet, the sound of a piano-note, and the sight of a green field : and secondly, the more special differences between impressions within the same group ; the difference, for example, between the

scent of a violet and that of a rose, or between the fresh spring green of the larch and the mature green of the cedar, or again, between the bark of a dog and the bleat of a lamb. All these are sensed as different in the naïve life of sense-experience. They are only perceived to be different when attention is specially drawn to the differences as such ; when the relations are rendered focal to consciousness.

We may now pass on to consider quantitative relations. And here a more accurate and exact training in the perception of relations is possible. Such training ought, I think, to have a more distinct and definite place in our system of elementary education.

The first stage in the perception of quantitative and numerical relations is that in which the quantity or number, as the case may be, is indefinite. One line may be perceived to be longer or shorter than another without a definite perception of the exact quantitative relation. So, too, one body may be perceived to be heavier or lighter than another ; one strawberry more or less sweet than another ; one note louder or softer than another ; one tint darker or lighter than another ; and so forth. These are continuous quantities not naturally broken up into separate units. Again, one group of objects may be seen to be more numerous or less numerous than another without the exact numerical relation being perceived ; one tree may have more blossoms than another ; a series of notes, of rhythmical movements, of touches, or of other impressions, may be many or few. We may perceive the numerical relations as simply more or less ; not as how many more or less.

The how much more or less involves the perception of definite quantitative or numerical relations. And this is impossible until numerical ideas, those for twice, thrice, four times, etc., and the words or other signs by which we symbolize them, have been grasped. The child has to associate the following :—



And he has further to learn that the grouping of the objects so numbered, and called one, two, three, etc., is immaterial. Take, for example, the following arrangement of five dots :—

The child has to learn that all these groupings are numerically equivalent—that is to say, that these are similar numerically, though different in arrangement or grouping. As a child I associated five with the arrangement and I remember being puzzled when the same word was applied to a different grouping. Even how I tend to visualize a group of five objects arranged in this manner. As a child, too, I had some difficulty from the fact that the same terms are applied to numbers and to qualities. That the relation of · to is the numerical equivalent of the quantitative relation of ——— to ———————— ; and that the phrase "one to five" expresses both, is not by any means obvious to the child-mind ; or certainly was not to mine. This may be overcome by

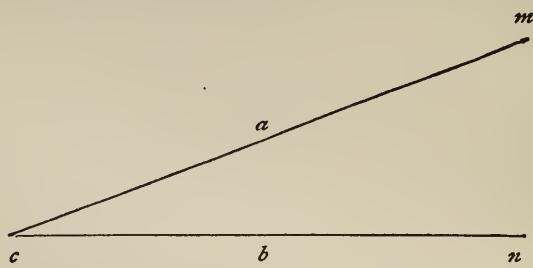
drawing a series of lines representing the relations of continuous quantities, thus :—

———	. 1
———————	.. 2
———————————	... 3
———————————————	 4
———————————————————	 5

The child may be trained in the perception of continuous quantitative relations by means of bits of wood or strips of paper of different lengths. He should also be taught by constant practice to draw lines exhibiting the simple quantitative relations of length. He will thus be correlating visual relations with motor relations ; or rather, speaking more accurately, he will be correlating visual relations associated with motor relations as given in eye-movements, and motor relations as given in finger or hand movements. One great merit of Slöjd is that it gives a training in the perception of continuous quantitative relations. And it is worth noting that by far the most accurate perception of the relations of continuous quantities are by means of eye-movements in correlation with visual impressions. This is probably due in part to the fact that the transitions in consciousness, for example, from the impression of one end of a line to that of the other end, are accompanied by the presentative sensory data of eye-movements ; and in part to the fact that, owing to the constant use of our eyes from morning to night, we have so much practice in the employment of this special mode of perception. In any case, as we shall see (p. 177), a good deal of use is made of the fact.

For much the same reason, the direct perception of

the quantitative value of angles is one that is of remarkable accuracy; for we are constantly looking out at the world around us along radii of a circle of which we form the centre, and radii which are inclined to each other at definite angles. Both for its own sake as affording a training in the accurate perception of relations, and from its great range and importance in physical science, the child can hardly be too soon, and cannot be too exactly, trained in the perception of angular values. Such training should of course be accompanied by practice in the drawing of angles and in the correlations this involves. We have, too, here a means of bringing out that which



is of so great importance in the acquisition of exact knowledge, the due perception of similarity with difference. The angular distance of *a b*, and of *m n*, in relation to the centre *c*, on radii from which they are placed, is the same; but the direct distance from *a* to *b* is only half that from *m* to *n*; while the distance of *c* to *a* is greater than that from *c* to *b*, and that of *c* to *m* greater than that from *c* to *n*. When we remember that in astronomy our direct measurements are those of angular distance, and that the bodies so observed are at different distances from us the observers; when we remember, too, that the

positions of places on our geographical maps are given in terms of angular distance—that is, in degrees, minutes, etc.—it will be clear that the training in such perceptions of angular relations will be of great service to the child as he proceeds with his studies. There are a great number of people of average education and intelligence who could not tell you why we speak of "degrees" of latitude and longitude, and for whom the phrase "angular value" has little or no meaning. And this is in large measure due to the fact that their powers of perception have never been exercised in relations of angular magnitude.

The direct perception of relations of area or superficial extent is a good deal more difficult than that of relations of linear length. Nor is this to be wondered at, since it involves, at any rate in its more exact application, two dimensions in space. Not that the child need in the first instance analyze the areas the size of which he is comparing into linear relations in two directions. At first he directly perceives, without analysis, that one area is larger than the other, and then roughly how much larger. But it will be found that the more nice and exact perception of the relative sizes of different areas involves the more or less conscious analysis of the area in its two dimensional directions, and the synthetic combination of the two perceptions in the final perception. This therefore serves as an example of what we may term *compound perception*, the final result of which is due to the synthesis of simple perceptions. An example of the same kind of thing carried a stage farther, is seen in the quantitative perception of cubical volumes.

Here, for the purposes of exact comparison, linear perceptions in three dimensions have to be combined in the final result.

The perception of quantitative relations of weight, of pressure, of depth of tint in color, of amount of salinity, acidity, or sweetness in taste, are less accurate than those of linear length, probably, as before noted, in part at least, from the fact that the transitions in consciousness are in these cases not accompanied by continuous motor sensations. Still, even in these cases, practice improves to a surprising degree the accuracy of perception. The artist can perceive relations of intensity and purity of color in a way in which no one without his special training could hope to do. The tea-taster and the wine-taster acquire an accuracy of perception which to one who is untrained appears to be the result of an unusual natural gift; while a man who has been trained in such work detects differences in the scent of different samples of raw tobacco-leaf which to ordinary perception would pass unnoticed.

The direct perception of time-relations is seldom made a matter of practical observation, except to some extent in music. It is not difficult, however, to perceive the equality or inequality of a series of time-intervals, unless they are too long. If a series of taps about a second or so apart be made, one can readily perceive whether they are equidistant in time, or whether the intervals are too short or too long. Nor is it difficult to say whether, when one short interval has been given, another, similarly given, is twice, thrice, or four times that interval. In these cases we tend to fill in the gap with so many similar

intervals—two, three, four, and so on, as the case may be. When a series of similar intervals are presentatively given, it is surprising with what accuracy extensive groups of them can be perceived without counting. Listen, for example, to the ticking of a clock or your watch. The sounds may readily be made, without actual counting, to fall into a rhythm. If, for example, I listen to the ticking of my watch, the sounds tend to fall into a six-rhythm or an eight-rhythm. The first of every six or of every eight is, so to speak, emphasized. This emphasis is independent of actual counting. When the rhythm has been established, one may, without much difficulty, group the emphatic sounds into a wider rhythm of their own, and thus, through the double rhythm, perceive time-intervals of many seconds.

You will probably find that, if you experiment in this way with your watch, when a six, eight, or other rhythm has been established, you have timed your breathing to the rhythm—a pretty example of subconscious correlation. Of course, by counting the sounds, or more readily by counting the rhythmic sets of sounds, we can accurately measure intervals of almost any desired length; but here we are going beyond direct perception.

Note that we are in such cases dealing with compound perception; we are combining the perception of time-relations with the perception of numerical relations. Omitting now this numerical element in the perception of time-intervals, dealing, that is to say, with the intervals as such, and not with the summation of a number of similar intervals, we may inquire what is the psychological nature of

the time-relation. It would seem to be primarily the amount of sense-fading which an impression has undergone. An impression, whether of hearing or sight or touch, does not disappear from consciousness suddenly, but fades gradually. It does last, indeed, for a little while without any sensible fading. A visual impression, no matter how instantaneous the physical cause thereof may be—as in the case, for example, of the electric spark—dwells in consciousness about $\frac{1}{25}$ of a second without sensible fading. If, therefore, sparks follow each other more rapidly than twenty-five to the second they appear continuous to the eye, though by the ear, in which the sense-fading is much more rapid, they are heard to be discontinuous as a series of distinct snaps. Hence the blurred appearance presented by the spokes of the wheels when a gig is in rapid motion. The photograph sees (if one may so describe its action) very much more instantaneously than the eye. Hence instantaneous photographs of animals in motion look unnatural; the photograph sees them and fixes them in a way that no human eye can ever see them.

There is thus a short period in which there is little or no sensible fading. Beyond this period the impression lingers in consciousness, and fades away gradually. In directly perceiving time-relations we are perceiving the amount of this fading. Natural bodily rhythms, like that of respiration, or that of walking—into which this element of fading also largely enters—are of considerable assistance to us, through correlation, in perceiving the quantitative value of time-relations.

There is one more point to notice about the per-

ception of time-relations. It is that for purposes both of science and of daily practical life we translate them, so to speak, into space-relations in order that we may perceive their exact value. We look at the clock, and perceive that the minute-hand has passed over an angular distance of 60°, and at once say that ten minutes have elapsed. In the sundial we estimate time by the space over which the shadow has passed. King Alfred perceived time-intervals through the intervention of space-intervals when he noticed how much of his candle had been burned away. The savage perceives the position of the sun in the heavens and thus notes the passage of time.

Attention must now be drawn to the fact that *the relations which we perceive are in all cases particular relations,* though it does not by any means follow that the related terms should both be particular. The particularity lies in the relation, not in the terms that are related, one or other of which may be, as we shall hereafter see, the product of generalization. We perceive the length-relation between this line and that line, the size-relation between this area and that area, the relation of pitch between this note and that note, or, if we have good auditory memories, between this note and our auditory idea of the tenor A, the relation of color between this tint and that tint, or perhaps between our visual idea of the full red of the spectrum and the red of last night's sunset. Where we are actually perceiving the relation between two presentative impressions—the relation, for example, of the taste of this nectarine and that peach—we may, as before suggested, speak of it as presentative, and call it an "impression of relation";

the "idea of relation" is then the re-presentation of a relation that has been perceived. But when we perceive the relation between two sense-ideas, as in the case of the red of the spectrum and that of last night's sunset, the relation is presentative though the ideas between which the relation is perceived are representative.

It will be noticed that perception makes new use of the old materials of sense-experience. In sense-experience all the data for at any rate the simpler objects of perception are already given; but they are given in subconscious awareness, not in fully conscious focal perception. The impressions are given in the clear definiteness of focal consciousness; the transitions between them are also given, but only in the half-light of subconsciousness. Attention has never been reflectively focussed upon them. When the clear illumination of attention is reflectively thrown upon them they become objects of perception. That is what is meant by saying that perception makes new use of the old materials of sense-experience. If one may so put it, the head and tail of the surrounding world is given in sense-experience; but it needs perception to see the relation of head to tail in that experience.

Perception thus presents to consciousness new objects, namely, the relations which are perceived. But not only are there new objects in the focus; the marginal region, and with it the whole field of consciousness, is modified, and profoundly modified, by the introduction of a new set of elements. Sense-experience deals with impressions of sense and their re-presentative ideas, and the margin or background

in sense-experience is constituted by elements of like order, presentative or re-presentative. The object of sense, set in such a margin, is the sencept. But when perception introduces the new elements which we term relations, these elements are, so to speak, woven into the margin or background of consciousness. An object of sense is now no longer a new impression, but this and something more. It is set in a background which perception has rendered relational. To such an impression set in a subconscious relational background we may apply the term *percept*. When I look out, as I am now doing, across the blue-green waters of Weymouth Bay and see the headland of Portland against the horizon, this is not merely an impression of sense; it is a percept, since it is set in a background of space-relations, wrought into the margin of my consciousness by all my past experience of such relations. And when I see a column of white spray suddenly rise from the water, I listen attentively, and after an interval of half a minute or more I hear, and even feel, the boom of a great gun. The Channel Squadron are "prize-firing" in the bay. The spirt of water I see, the boom of the cannon that I hear, the reverberations which roll along the bay from cliff to cliff, all these are for me not merely impressions of sense, they are raised to the level of percepts through their relational setting. And when the prolonged reverberation gives rise in my mind to the idea of thunder, this is not due merely to the natural resemblance in the sounds, but also to the influence of perceived similarity of relations.

The percept, then, is the point of application of

the ideas of relation with which the mind has been stored by the exercise of the faculty of perception and, we may add, of those generalized ideas with which the next chapter will deal.

CHAPTER V

ANALYSIS AND GENERALIZATION

When we analyze a substance chemically we split it up into its constituent elements. We might examine a drop of water with the highest powers of the microscope, and we should not be able to distinguish the constituent oxygen from the constituent hydrogen. But when we take pure water and by appropriate means analyze it chemically, we separate the constituent hydrogen from the constituent oxygen. We may term this kind of analysis *dissociating analysis.* But if instead of pure water we select such a substance as a piece of granite, we may analyze it to some extent without submitting it to the process of chemical dissociation. By careful examination with the naked eye or with a lens, we may distinguish the constituent minerals, the quartz, the mica, the felspar, and so forth. We do not dissociate them in this case ; we leave them just as they were ; we merely distinguish them. And in doing so, we may fix our attention first on the quartz, to the subordination of the mica and the felspar ; then on the mica, to the subordination of the other two constituents ; and then on the felspar in like manner. This we may call *distinguishing analysis,* as contrasted with the dissociating an-

alysis of chemistry. It is of distinguishing analysis, not of dissociating analysis, that I am now going to speak.

We may treat any impression or series of impressions in a manner analogous to that in which we treated the impression of a piece of granite. We may single out certain constituents for focal attention to the more or less complete subordination of other constituents. But is not this just what we do in our daily practical experience? Do we not have a focal impression and marginal constituents which are so far subordinated as to be relegated to the sub-conscious background? Yonder yacht that I see beating up against the wind, am I not selecting that for focal attention, and practically neglecting the rest of the visual field, rocks, sea, sky, to say nothing of numerous other constituents, auditory, olfactory, tactual, and other, of the subconscious margin? Certainly we have here the faculty which, applied to a new end, makes distinguishing analysis possible. But it is just in this special application that the difference lies. When I fix my attention on the yacht to the practical neglect of so much that is marginal in consciousness, I do not do so for the purpose of analysis. But if I consider what was the nature of my state of consciousness when I looked at the yacht, directing my procedure to the special end of distinguishing the focal impression from the marginal setting, then I take a step in analysis. In the analysis, as such, there is conscious and intentional reference to the relation of that which is distinguished to the subordinate residue from which it is thus distinguished.

Let us, however, look at the matter in its objective

aspect first; for it is in this aspect, and this only, that we should teach our children to analyze. I pluck a pimpernel from the ground at my side, and distinguish root, stem, leaves, and flower; and, continuing my analysis, distinguish in the flowers, bracts, petals, stamens, and pistil. The analysis is purely objective; I am not considering the subjective aspect of the states of consciousness. In distinguishing each part, and focussing my attention upon that, to the temporary subordination, but by no means the complete neglect, of the other parts, I have in view its relation to these other parts from which I am distinguishing it. We may say, then, that this analysis with which we are now dealing is the art of *making predominant some particular element in a complex impression to the subordination of the other elements*, and of *perceiving the relation of the predominant element to the subordinate elements*. There is probably no subject better fitted than elementary observational botany for training a child in this objective analysis. The several parts of a plant lend themselves admirably to successive selection for predominance; the relations of the parts to each other, and of each to the whole, are comparatively simple; and material for study is readily obtainable. Of course, the training must throughout be practical, in actual touch with the natural object. The teacher must refrain from introducing explanations beyond the grasp of the child's mind. He must, in fact, have clear ideas of what he is teaching, and what mental faculty it is his object to train and strengthen. An occasional visit to a museum, when that is possible, will afford a great variety of objects on which the

child may be taught to exercise his powers of analysis. In a country walk the elements of scenery may be made to serve the same end. The hill may be made focal and predominant, the valley being temporarily subordinated, and the relation of the valley to the hill brought home to perception, the slopes sweeping upward to constitute the high ground. Then the valley with its streamlet may be made predominant, the hillsides being subordinate, and a new aspect of the relation may be emphasized in perception—the hillsides sloping to the valley bed and forming the collecting ground for the waters of the streamlet. In a seaside ramble the analysis into headland and bay, and the relations they bear to each other, may similarly be brought out. Nor is it necessary to go to field or museum, to hillside or headland, to find materials for this purpose. The qualities of size, shape, color, weight, hardness, resistance, are possessed by the commonest solid objects, and each of these qualities may be severally distinguished in analysis from the other qualities with which it is naturally associated ; each may in turn be made focal and predominant to the marginal subordination of the others ; and the relations of each as predominant to the others as subordinate, may be brought home to perception.

Subjective analysis, involving as it does introspection and close attention to the phenomena of consciousness, is not a matter for children. But the teacher may with advantage exercise himself in such analysis. He may distinguish in the subjective aspect of the impression the several sensations which constitute it, and may render now one, now another,

predominant to the subordination of the others, and endeavor to perceive the relations which hold good between them. He may exercise himself in rendering focal and predominant sensations, such as the motor sensations, which are normally subordinate—for example, the sensations which accompany the accommodation of the eyes for varying distances, or the motor sensations in writing, drawing, and other skilled activities. He may practise himself in rendering focal the perceptual part of his experience, and the relations which under ordinary circumstances are taken for granted and pass unheeded. He must remember that a good deal of experience which was once fully conscious and needed attention has long ago for him become subconscious and needs no attention; and that the child is in the condition in which he himself once was, and which he can only realize by a special effort directed to that end. And as he carries on his introspective analysis he will come to understand more clearly how the states of consciousness which is naïve sense-experience are sensed as wholes, comprise numerous constitutent elements which in analysis may be distinguished and rendered successively predominant, thus rendering possible the perception of the relations which hold good between them.

Let us here notice that the process of perception which we considered in the last chapter in part involves and in part leads up to the analysis with which we are now dealing. When we perceive the relative sweetness of two strawberries, or the relative weights of two pieces of metal, we make these particular qualities of the natural objects predominant, since it

is the relation in respect of these particular qualities that we are perceiving. So too when we are perceiving the relative lengths of two sticks, or pieces of string, or lines drawn upon paper or on the blackboard, it is the length element in the impressions that we cause to predominate over the other characters, such as the color, black or gray in the case of the line on paper, white on the blackboard. Thus the process of perception helps to lead up to that of analysis, since it necessitates the predominance in consciousness of that particular aspect of the impressions to which attention is directed in perceiving the relation. Wherein lies the difference, then, between the predominance given in the act of perception and the predominance given in analysis? Again we must answer, In the purpose and end in view. In perception we neglect or ignore such elements of the impressions as are not involved in the special relation which is the object of perception. They nowise concern us for the purposes of perceiving the relation. But in analysis our aim and object is to render a particular aspect of the impression predominant, with a view to perceiving its relations to other aspects of the impression which are temporarily subordinate. In the one case we neglect or ignore all those aspects of the impression that are not rendered predominant; in the other case we make them subordinate in order that we may perceive the relations which they bear to that which we are making for the time predominant. We analyze the plant into root, stem, leaves, flowers, and so forth, in order that we may perceive the relations which these parts bear to each other in the plant.

The complement to analysis is *synthesis*, a fully conscious and intentional process, to be distinguished from the "natural synthesis" of which we before spoke. When we have analyzed our plant into root, stem, leaves, flowers, etc, when we have perceived the relations which these parts bear to each other and to the whole of which they are parts, then we synthetically recombine the constituents in their due relations. Only when we have done this, and when we have perceived the relations of this object to other objects, does the plant stand out as a fully developed *percept*. We look at the plant with the same eyes; it is still an object of sense-experience, but it is this and something more. It is set in a background of relations which have been duly perceived; it is an object of an experience in which sensation and perception have been combined, and towards which each has contributed in due degree and proportion.

Let us note how analysis and synthesis are combined and co-operate in spelling and in pronunciation. Take, for example, the pronunciation of such a word as "flag." We pronounce the word rapidly, and regard it as a whole. But now let us analyze it. Pronouncing it slowly, and paying attention to the sounds and their accompanying vocalization-movements, we find four constituents, each of which is made predominant in turn to the subordination of the others; the relations of each to the other being perceived. Having thus analyzed and perceived the relations of the analytic products, we recombine in accurately proportioned synthesis; and the word "flag," as we again rapidly pronounce it, is a definite percept. So too with spelling: we analyze the

word "flag" as written or printed. We make each letter in turn predominant, and take note of its relation in the word to the other letter; and then, taking in the whole word at a glance, we view it synthetically, recombining the products of our analysis. Finally, we correlate the two analyses, and perceive the points of similarity and the points of difference. There are four letters, as there are four sounds: the names we give to the first two pretty closely resemble to our ear the pronunciation-sounds in "flag"; but the names we give to the last two differ markedly for the ear from the pronunciation-sounds which enter into the synthesis of the word "flag" as pronounced. The object of spelling reforms is to assimilate pronunciation-sounds and the sounds of the names we give to the constituent letters, to get rid of the anomaly of spelling the same sounds in different manners (as in the latter part of the words "beau," "queen," "mien," "serene," and "quinine"), and of spelling different sounds in the same manner (as in "enough," "bough," "trough," "borough," and "hough").

Let us now pass to generalization. Attention has already been drawn to the fact that the objects of perception are particular relations. We perceive the relation of pitch between this note and that note, the relation of length between this line and that line, the relation of color between this leaf and that leaf. In all such cases of perception we are dealing with the relations between particulars. In the case of quantitative relations perception is also particular. We perceive that the weight of this piece of metal is twice the weight of that; that this time-interval

is thrice that; that this slip of paper is half the length of that slip. But it must soon strike the child who is exercising his faculty of perception, that the same relation holds good for a number of pairs of objects; the objects exhibiting the relation differing while the relation itself remains unchanged. Two marbles are placed at a distance of a yard apart: the marbles may be removed, and pieces of stone, or bits of wood, or marks on the floor, may be substituted. The distance-relation is perceived to remain unaltered. Or the marbles, the pieces of stone, the bits of wood, the marks on the floor, may be arranged, a yard apart, in different parts of the room; and the child may perceive that the space-relations are in all the cases similar. The distance-relation common to a number of distinct and separate perceptions is thus floated off, so to speak, from the particulars in and through which it is exhibited, and the child reaches the general idea of the distance which we call a yard. Again, the child may perceive that this piece of metal is twice the weight of that, this line twice the length of that, this time-interval twice as great as that; and then further perceive that the quantitative relations are in all these cases the same. He thus gains a general idea of the numerical relation which we symbolize by the word "twice"; the general idea being floated off from the particular cases in which it is exemplified. Such a general idea of relation thus involves the perception of the similarity of a number of special relations; the distinguishing in analysis of the relations from the particular objects which exhibit the relations; and the grouping of these similar relations under one general head. This

grouping together of a number of relations, distinguished through analysis, in virtue of their perceived similarity, is termed *conception*.

Note, however, that conception, properly so called, is a fully conscious process performed with a definite end in view. The generalization from particulars is an intentional one. It involves an extension of that reflection to which allusion was made in the last chapter. For it is clear that if we are to perceive that the same relation holds good in a number of particular instances, and thus to conceive the relationship in general, we must look back reflectively, not only on the experience of a moment ago, but on that more prolonged experience during which the particular instances were presented to consciousness. Note also that, whereas the particular relation which is the object of perception may be in such close touch with presentative impression that we may speak of it as itself an impression of relation, the generalized relation which is the object of conception is necessarily the outcome of attention directed to re-presentative experience, so that we cannot speak of a general impression of relation, but must speak of a general idea of relation. Impressions must always be particular; ideas may be particular or general. The products of generalization are ideas, not impressions.

In the development of experience, perception precedes conception, which follows after a longer or shorter interval. Some psychologists would, however, deny that this is so. They say that in perception we apply a general conception to a particular case. We apply, for example, the general conception which we symbolize by the word "half" to the

particular case of the weights of these two pieces of metal. They say, further, that the term "weight" is itself symbolic of a general conception of which we merely see a particular example in this or that body which, as we say, possesses weight. Every term which we employ to express relations is, they say, expressive of a general idea, such as hardness, length, sweetness, color, and so forth. If, then, they argue, we are, in perception, applying a general conception in a particular instance, it is clear that the conception which we thus apply must precede the perception which consists in its special application.

This sounds somewhat convincing; and it may not at first be easy to see what reply is to be given to this contention. Moreover, it is perfectly true that when we perceive that an angle of 10° is twice an angle of 5°, we are applying certain general conceptions to a particular case. It will be worth while, therefore—especially as the relation of perception to conception is one that it is important to make clear—to take some trouble in endeavoring to put the matter in what would seem to be its true light.

Let us take a particular case. A child is given two pieces of metal, and is taught to perceive that the one is heavier than the other. Let us suppose that he succeeds in perceiving the relation which we wish to bring home to his perception. It is symbolized for him by that word "heavier." In perceiving that the one piece of metal is heavier than the other, the child is not applying a general conception to the particular case. He has not yet reached a general conception of weight, and cannot reach it until he has accumulated a store of particular instances

from which, by generalization, the conception can take form in his mind. The perception, then, for the child is quite particular, and not a case of the general exemplified in the particular. We proceed now to exercise him in this mode of perception. We give him a great number of pairs of material bodies to poise in his hands and tell us which is the heavier of the two. As he does so, he cannot fail ere long to perceive that the relation of *a* to *b*, which we call "heavier," is similar to the relation of *c* to *d*, which we also call "heavier," and this again to the relation of *e* to *f*, called "heavier," and so on in a number of pairs of cases. As long as he is dealing with particular pairs of cases he is perceiving that they are similar each to each; he is perceiving the similarity between particular relations. But when it strikes him that all these cases are alike, that the word "heavier," which was used in each case, applies to all; when, his attention being drawn to this fact, he consciously and intentionally comprises them all in a general idea to which the common term "heavier" is applied; then he not only perceives that they are similar each to each, but conceives their general similarity; then the word "heavier" no longer stands only for a particular relation, perceived in this, that, and the other case, but it stands for the conception of a common relationship.

It will be observed that we apply the same term "heavier" both to the particular perception and to the general conception. No doubt this aids the child in generalizing and in reaching the conception. But it tends to obscure the fact that the process of perception is distinguishable from the process of con-

ception. And when once the conception has been reached, the word "heavier" is bound thenceforth to carry with it conceptual force. So that, *after the conception has been reached,* when a child perceives, for example, that this small volume of mercury in one vessel is heavier than that large volume of water in the other vessel, he may not incorrectly be said to be applying his general conception "heavier" to a particular case in which it is exemplified. The sequence then would seem to be, first, a perception of heavier; then other similar perceptions; then the perception that these are similar, each to each; then the conception of their similarity and the generalization of the term "heavier" and the ideas it expresses; finally, new perceptions of like character carrying with them a conceptual import.

Note, then, how perception and conception play backwards and forwards as experience develops and ripens. We begin with perception, and out of this there grows, through generalization, conception. In further acts of perception we view the results in their bearing upon the conception we have already reached, and thus make this conception fuller and more adequate. Every step in perception makes the conception wider and richer; and the enriched conception renders further perception less isolated and more full of meaning. In conception we are floated off from particulars and rise into the region of *thought*; in perception we bring back our conceptual thought into touch with practical experience. When once the power of generalization has been developed, we are terribly apt to apply it hastily and on inadequate grounds of perception; it is only by constantly

bringing it into touch with further and more extensive perception in practical experience that we correct the hastiness and inadequacy of our generalizations and give them serviceable validity and reality. It is essential that the teacher should bear this in mind, that he may guide the child, not only in the acquisition of general ideas, but in constantly submitting them to the touchstone of experience.

To the products of the double process of perception and conception, as employed for a common end, we should apply the word *knowledge*. Sense-experience is not knowledge, though it presents us with the raw material from which knowledge may be elaborated ; perception by itself is not knowledge, for knowledge involves the generalization of particulars, the importing into them of general meaning. Only when perception and conception act and react on each other in the way we have just been considering, does knowledge, properly so called, take form and shape.

Special reference should here be made to quantitative relations. Their generality would seem to be part of their peculiar nature ; and here, if anywhere, we might expect conception to precede perception. It may, indeed, be contended that while we may perceive this piece of metal to be heavier than that piece of metal, prior to any general conception of "heavier," we could not possibly perceive the one to be twice as heavy as the other, prior to any general conception of the meaning of the word "twice" and the idea it conveys. The idea "twice" is, it may be said, in its essential nature general, and would be without meaning if applied to a merely particular relation of this

weight to that weight. We may agree with this contention to this extent—that it is extremely improbable that the child would acquire his first perception of the relation of two to one by means of perceiving the relative heaviness of two pieces of metal. It is quite likely, therefore, that when the child perceives the quantitative relations of heaviness, he has already reached the conception which we symbolize by the word "twice." We may not so readily agree, however, to the assertion that the child reaches a conception of the relation of one to two before he perceives the relation in particular instances. There can be little doubt that the child reaches his conception of "twice" in just the same way as he reaches his conception of "heavier." He first senses the difference of one thing from two things. They form different impressions in sense-experience. He then perceives the difference as a relation of a particular kind. When he has perceived it in a number of particular instances, he generalizes and reaches a conception of the relation. Then, and not till then, the relation has for him a general meaning. It is some time before he comprises in his generalization the relation of two to one as applied to separate objects, and the relation of two to one as applied to continuous quantities. As I have before mentioned, I can myself remember being puzzled in the matter. I had not at that time generalized sufficiently to reach the conception of the relation of two to one applying both to such cases as . . to . , and——— to ——. But from their very varied and general applicability we may surmise that the perception of numerical relations very early gives rise to the conception of such re-

lations. And, in general, that conception, though it never precedes, follows hard upon the heels of perception. As before mentioned, our words for particular relations, as perceived, are the same as those which we employ for the relations as generalized and conceived; and this must aid the child in rapidly passing on from perception to conception. The generalization of experience in conception was not alluded to in the last chapter, for the sufficient reason that our object then was to get clear ideas of the nature of particular relations, for which purpose it was necessary to keep distinct, in description and apprehension, mental processes which, though they take origin in close association with each other, are none the less themselves distinct.

The relation of perception to conception having now been illustrated, we may pass on to consider the relation of the percept to the *concept*. The term "percept" was applied to an impression set in a background which perception has rendered relational. When the child is looking at a plant, in which the relation of root to stem, stem to leaves, and leaves to flowers, has been perceived, the plant is no longer for him an impression of mere sense-experience. It is a percept: the impression is set in a subconscious relational background. But when the child has examined a number of plants, and has generalized his perceptions so as to reach general conceptions of the relationships involved; when he has not only analyzed some particular plant, so as to distinguish the several parts, but has analyzed a number of plants into parts more or less similar and more or less similarly related; when he has further recombined the generalized prod-

ucts of his distinguishing analysis into a generalized plant ;—then he reaches a concept. Henceforward, when he looks at a plant, he sees it not merely as an object of sense-experience ; not merely as a percept, or impression set in a background of perceived relations : he sees in it a particular exemplification of his general concept "plant." And just as there is a constant to and fro play from perception to conception and back again on perception, so is there a constant to and fro play from the percept to the concept and back again on the concept. Our concepts, like our conceptions, are terribly apt to be vitiated by hasty generalization, and also by imperfect analysis and incomplete synthesis ; but by constantly bringing them into touch with perceptual experience, we render them clearer, more real, in closer accordance with the natural relations of the things from which they have been floated off in conceptual thought. Every application of the concept to the touchstone of practical experience renders it richer and more exact ; and the richer and more exact concept sheds its light on the percept and gives it fresh meaning for thought. Thus by action and reaction our knowledge grows in range and exactness and in general meaning.

The percept precedes the concept in natural order of genesis just as perception precedes conception. At what exact time, in the development of the child's mind, concepts are formed, it is very difficult to say, because the same word may, as we have seen, stand for a sense-idea, a percept, or a concept. Take the word "sheep," for example : in his earliest experience this word is associated in the little child's mind with the sense-impression, and tends through association

to call up or suggest a sense-idea. Probably this sense-idea is generic. If the child has seen, as he probably will have seen, a number of sheep, each differing from the others in minute, unnoticed points of difference, the word "sheep" is not likely to suggest the sense-idea of any one of them, but a composite sense-idea, with the blended features of a number of sense-impressions. Such a composite sense-idea is termed *generic,* to distinguish it from a general idea. The generic sense-idea is not a voluntary product. It results from the slight individual variations of the impressions of which it is re-presentative. A great number of our sense-ideas are thus generic. Hence, if we are asked to visualize a sheep, the visual idea or image does not precisely resemble any one sheep we have ever seen, but the blended features of many sheep. The general idea, on the other hand, is the result of the conscious and voluntary exercise of the power of generalizing. No doubt the natural tendency to form generic sense-ideas is utilized when we voluntarily generalize ; just as the natural tendency to make the impression focal in a marginal setting is utilized when we voluntarily analyze. In mental development we are constantly putting old powers to new uses.

The word "sheep" may, then, suggest to the mind of the little child a generic sense-idea. At a later period, when its eyes, ears, mouth, head, trunk, legs, and tail (if it have any left) have been indicated, and their relations to each other and to the sheep as a whole, together with the relation of the sheep to the grass and the field, have been grasped, the word "sheep" may suggest to the child a percept, an im-

pression or idea set in a backgronnd of perceived relations. Yet later, when the child has begun to generalize and to build the general results of the analysis of many sheep into a synthetic concept, then the word "sheep" may symbolize the result of this more complex mental process. The word "sheep" (and the same is true of common nouns in general) may stand for a generic sense-idea, for a percept, or for a concept. And when a child, who cannot as yet tell us much, if anything, concerning his mental processes, uses the word, it is extremely difficult to say what stage of development his use indicates.

Classification takes its origin in combined analysis and generalization. In the fully-developed form to which it would be well to restrict the word as a technical term, it is a fully conscious and voluntary process—a process performed with the special end of classification in view. No doubt, there is a preliminary involuntary process which leads up to the consciously intentional process. The child, who applies the same word "dog" to a number of animals, differing somewhat markedly from each other, but having certain distinctive features in common, is carrying out a process which is preliminary to and which leads up to classification. But when, through the application of analysis, the child pays attention to the number of legs this, that, and the other animal possesses; the dog and cat with four legs, the bee and beetle with six legs, the crab, lobster, and crayfish with ten legs, man and barn-door fowl with two legs; and when he has generalized the knowledge thus acquired; he is ready consciously and intentionally to classify the animals into quadrupeds,

hexapods, decapods, and bipeds. The fully conscious and intentional nature of the process is seen in the fact that he is able to *define* the class in which he places the objects classified. The class of quadrupeds, he will say, comprises those animals which have four legs, the class of decapods those which have ten legs. The child should be exercised in conscious classification, and in the clear definition of the classes. Of course, quite simple cases should at first be selected. And here, again, scarcely any subject can be found which will afford more satisfactory material for training the child in classification than elementary observational botany.

Finally, we must glance at the relation of *abstraction* to the processes we have been considering. We have seen that in the process of analysis we make predominant now one, now another, constituent element in that which we analyze. We give separate names to these predominant elements that we distinguish. We distinguish, for example, the yellow in the flower of the gorse, and we give it the separate name "yellow." The distinguishable color sticks, so to speak, to the separate name, and enables us to float it off in thought from the flower which is yellow. In analysis we do not get further than *distinguishing* the yellow, making it predominant while the other qualities of the flower are subordinate. But the use of the word "yellow" helps us to do more than to distinguish: through its aid we can to some extent *separate* this quality; can talk about it, and in some degree think about it, apart from the flower which we perceive to be yellow. Such an idea of quality separated off in language, and to some extent in thought, from the

other qualities with which it is normally associated, is an *abstract idea*; and the process by which we thus separate it off is termed *abstraction*. When we think, too, of the space-relation which we term "a yard," apart from any objects by which this relation of distance is exemplified, we have an abstract idea of relation.

Abstraction and generalization usually go hand in hand. But they are not necessarily connected. I remember the first flower of that beautiful orchid, the *Dysa grandiflora*, which I plucked on the slopes of Table Mountain. I could form to some extent an abstract idea of its peculiar color, which resembles no other tint that I have ever seen. Such an abstract idea would be particular, and not generalized.

Probably we differ a good deal in our power of forming abstract ideas. For many of us abstract ideas are remarkably vague and hazy, and have a strong tendency to particularize themselves, when we try to think clearly about them, in perceptual ideas, thus ceasing to be any longer abstract. The words which stand for these abstract ideas are the abstract nouns, such as size, sweetness, color, edibility, kindness, virtue. But directly we begin to try and make them clear to thought, a particular example is apt to become focal. And in illustrating them to the child we are forced to adduce particular examples; we illustrate weight by handing the child a heavy substance, color by pointing to the red of a rose, kindness by reference to some kind action. Thus here, again, there is a continual play to and fro, from conception to perception, and back again to

conception. In this way do our abstract ideas become floated off from particular cases in which they are exemplified; while the particular cases themselves receive a new import and meaning as practical embodiments of our abstract ideas. Thus the particular is absorbed into the general body of our knowledge; while our knowledge keeps in close touch with practical experience.

CHAPTER VI

DESCRIPTION AND EXPLANATION

THERE are two little words that are constantly on the lips of children: How? and Why? The answer we give to the first is a descriptive answer; the answer we give to the second is explanatory. We may describe how an iron steamship floats upon water; we explain why it floats notwithstanding its enormous weight, and the fact that the materials of which it is built are heavier than water. We may describe the commercial greatness of London, the ships coming and going, the lines of railway converging upon this centre, the goods imported and exported, the varied occupations of its multitude of workers; we may describe how the town has grown in wealth and size during a long period of years; but we explain why it is so great, and why the growth and accumulation of wealth have taken place in London and not elsewhere. We may describe how the Battle of Waterloo was fought and won; and we may try to explain why it was fought and why the French were defeated.

In both description and explanation we are dealing with relations; but in description the relations are particular, while in explanation general relations

are involved. Try and describe anything you like, the simplest fact, the simplest object, the simplest natural occurrence, and see if you can do so without reference to relations—the particular relations involved in what you are describing. If one describes the position of an object, one is stating its relations in space to other objects. If one describes the object itself, one must refer to its size, shape, weight, and so forth, all of which involve relations. The simplest occurrence has its time-limitations, and cannot be adequately described without some reference to them. Of course we are supposing that the description has for its purpose a suggestion, through the intervention of language, of the real nature of that which is described. Even the vaguest description must give some idea of this nature; and this is impossible without reference to the perceived relations. The relations involved in description are, however, I repeat, particular and perceptual; though they may be, and indeed usually are for rational beings, set in a background of generalized conceptual thought. This particular nature of the relations involved in description may perhaps be questioned. That an island is a tract of land entirely surrounded by water is, it may be said, a perfectly exact description of what an island is in general. It is not a description of a particular island, but holds good for any island. The relations are generalized. That a circle is a plane figure of which all the radii are equal, is an exact description applicable to any circle. The general relations of all circles, not the particular relations in any one circle, are described. In strictness, however, we have, in these cases, not descrip-

tions, properly so called, but definitions. We are not describing an island or a circle; we are defining the concept island or the concept circle. It is, no doubt, merely a question of the exact sense in which we are to use the word "description." But the exact and accurate use of words begets exact and accurate modes of thought, which cannot be too sedulously cultivated by the teacher. Distinguishing, then, as thus suggested, between the definition of general concepts on the one hand, and description on the other, we may say that the latter word, in its more restricted sense, stands for a process by which particular relations are set forth; that it involves perception, but does not necessarily involve more than perception; though, since the language we employ is full of general import, the description may be, and usually is, set in a conceptual background.

In explanation, on the other hand, not only are we always dealing with relations, but generalization and the conceptual element are always present. They are necessary factors in the process. An explanation can never be wholly particular and confined to particulars. The relations peculiar and special to explanation are those which we condense in such words as "therefore" and "because." They are called *logical relations*. Let us now see if we can give anything like a real explanation without reference to the general and the conceptual. Suppose I show a child that a cork floats, and accompany my demonstration by a description. The child asks me why it floats. If I say, "Because it stays at the top of the water," I am not giving the child any real explanation of the fact. I am merely describing the fact in other words.

To explain that it floats because it floats, is no explanation at all. If I say, however, that it floats because it is lighter than water, I seem to be giving an explanation which is wholly particular; in which I do not go beyond this particular cork and that basin of water. But even this is no true explanation. It will not satisfy a quick-witted child. He will ask why its being lighter than water makes it float. We can only answer this question by reference to certain general properties of bodies in accordance with which they invariably, if free to move among each other, arrange themselves, under the influence of the earth's attraction, in order of weight from the greatest to the least.

Before proceeding further, let me say that it is of great importance that the teacher should clearly grasp the distinction between description and explanation, and should realize the fact of the invariable general nature of true explanation. It is one of the distinguishing features of good method in exposition that description should be kept apart from explanation. Many people use the two words without discrimination. They say, "Let me explain to you where the book may be found in the library;" or, "I will explain how you are to do such and such a thing." Or they say, "We will now describe why it is that a stone falls to the ground;" or, "Describe how it is that a balloon rises in the air." I have already noted that the word "describe" is often used for "define." We see in examination papers such questions as: Describe a cape, a promontory, an isthmus; and so on. The true answer to this would be to describe some particular cape, promontory, and isthmus. But what

is intended is : Define cape (not a cape), promontory, isthmus ; and so on.

Both description and explanation presuppose some one to whom or for whose sake we describe and explain. They refer to the action of the giver. Unfortunately, we have no two corresponding technical terms for the answering action of the receiver. When we mentally grasp either a description or an explanation, we commonly say that we understand it. It may be well, though much has been written on the understanding in a technical sense, to employ this word broadly and comprehensively, as is done in common speech, and to use technical terms to correspond respectively to description and explanation. Both etymology and good authority would seem to justify the use of the terms "apprehend" and "apprehension" in correspondence to describe and description, and the use of "comprehend" and "comprehension" in correspondence to explain and explanation. One who readily understands a description, then, has good powers of apprehension ; one who readily understands an explanation has good powers of comprehension.

The next thing to notice with regard to description and explanation is that they both presuppose analysis, while explanation necessarily presupposes generalization as well. We describe this pebble we have found on the beach as oval, gray, moderately heavy, tolerably hard, and made of limestone. In doing so, we make predominant in succession the several salient features of the object, and this, as we have seen, is just what is characteristic of the process of analysis. In the corresponding act of apprehension we take

these several features, given to us, from the nature of the case, in succession, and combine them by an act of synthesis into a whole. Not until the several features are thus combined can we be said to apprehend the description as a whole. Suppose a child asks, "Why has the pebble this rounded form?" We give him as a preliminary answer, "Because it has been rolled about by the waves." And if he then asks—as we should encourage him to ask—"But why does the rolling of it by the waves give it a rounded form?" we should, if opportunity occurs, take him down to the beach, show him how the waves are rolling the pebbles over each other and knocking them against one another; describe in particular cases how each stone has its angles knocked off and rubbed down; and when he has apprehended this description, get him to comprehend the generality of the result. All the pebbles are thus rounded. It is, given sufficient time, the universal and uniform result of this mode of natural action. When he has comprehended this generality of the effect produced, we give him the true explanation of the rounded form: "Because the pebble has been rolled about by the waves, and it is found that such rolling always gives rise to a rounded form." This explanation, and its due comprehension, involve analysis, for we are making the shape predominant to the temporary subordination of other features presented by the pebble; and it presupposes generalization, for we explain it by showing that it is a particular example of the action of a general law.

Let us take another example to show how explanation is the reference of the particular to the general.

A good many years ago, when I was a young student, a clever lad in Cornwall asked me the old question, "Why does a stone fall to the ground?" Not wishing to put him off with the long-sounding words, "Universal gravitation," I replied, "Because it is heavy." "But a feather is not heavy and yet it falls to the ground," was the prompt answer. I replied that the feather was relatively heavier than the air. The lad was silent for a moment, and then said, "That's just one of the things I want to know: does the air fall to the ground and collect there like water in a pond, only we cannot see it because we are in it and it is invisible?" I saw that this lad's powers of comprehension were fully equal to the occasion, and explained the whole matter as best I could. I told him that he was quite right in supposing that the air, like the stone and the feather, was attracted by the earth; I pointed out the universality of gravitation as a law of nature; and then reverting to his first question, I said, "You now see that we explain the fall of the stone as a particular case of the action of a law that is universal in its generality." He was again silent for a moment, and then asked, "But what makes the earth attract it after all?" I laughed, and said, "You're a philosopher! Nobody can answer that question. Perhaps you may live to find it out, or at any rate to understand the solution when it comes, as come it may."

The explanation of the fall of a stone by reference to universal gravitation is a valid explanation; but the explanation is partial and incomplete, not final and ultimate. We cannot give a final and ultimate explanation of any of the phenomena of nature. We

explain this, that, or the other natural occurrence by a reference from the particular to the general; but if we are asked, "Why are these general laws what we find them to be?" we can only reply, "Because that is how nature is constituted." And if we are further pressed with the question, "But why is nature thus constituted?" we can only, if we are honest, reply that we do not know. Ultimate explanations are beyond our reach.

Remembering, then, that by explanation is meant the reference of the particulars, which we seek to explain, to such generalizations as are within the reach of our mental grasp, we may next note that the statements of these generalizations are what we term natural laws. Such statements are of the nature of definitions. We define the law of gravitation, for example, as follows: That attraction of any two natural bodies for each other which is termed gravitation is directly proportional to the sum of their masses, and inversely proportional to the distance of their centres of gravity. The generalization thus accurately defined forms the standard to which we refer the particulars we wish to explain by its means. It is a generalized summary of a great number of particular observations; but it contains something more; it contains the assumption that this generalization from a great, but still necessarily limited, number of observations is universally true. That assumption we can never conclusively prove; we rest our assurance of its truth on the fact that no single exception to its validity has been established on the basis of exact observation. Our attitude towards it may therefore be thus expressed: We have found it to

hold good in a great number of particular cases, and shall assume that it holds good in all cases, until evidence to the contrary is forthcoming. Our whole process of explanation involves this assumption. We explain a new instance of gravitational attraction by reference to a generalization from old instances; and in doing so we must assume that what holds good for the old instances also holds good for the new instance. As this is true of all explanation, from the simplest to the most recondite, the teacher, who has many things to explain, should clearly grasp the basis upon which his procedure rests.

It is obvious that adequate description should always be made the precursor to explanation. Not to do so is to proceed on the method, not of education, but of cramming. The explanation must never be allowed to be a mere statement committed to memory, and remembered, if remembered at all, through the association by contiguity of its constituent parts. We must always bear in mind that the comprehension of the learner is to meet and embrace the explanation of the teacher; that comprehension involves generalization; and that generalization is impossible unless the particulars which form its raw material be supplied. One of the difficulties the teacher has to face—I assume that he knows the subject he professes to teach—is that he possesses a background of knowledge which is absent from the mind of his pupils. The explanation for him is supported by a body of evidence which he could at any moment summon from the storehouse of memory, and the net result of which is present in the background of his consciousness. The explanation he gives is there-

fore, for him, real and valid, because it is the result of generalization from all these particulars. He gives it to his pupils, and expects it to be real for them. But it will not be real unless he have stored the memory of those whom he teaches with a sufficient body of evidence, the net result of which is present in the background of their consciousness. One of the commonest faults in exposition is the putting forward of explanations before an adequate preparation in description has been systematically afforded.

It must be remembered, too, that the adequate apprehension of what is described with sufficient fulness of detail, is after all only a second-hand way of getting at the facts. Second-hand information, to be of real value in mental development, must have a first-hand basis in practical experience. Hence, if description is a necessary precursor to explanation, so too is a training in *individual observation* a necessary accompaniment to description, however careful and adequate. We can only rightly apprehend and, as we say, fully realize, a description of that for which individual observation has paved the way, by affording to consciousness sense-impressions to be utilized representatively as sense-ideas. Descriptive geology, for example, deals with the nature, mode of arrangement, and fossil or mineral contents of the strata which are exposed on the surface of the earth, and with the manner in which these strata are worn away by rain and rivers and the waves of the sea. Now, if the student makes himself practically acquainted with the strata in any district in which they are well exposed, if he examines them along any stretch of

varied coast-line, if in actual contact with nature he perceives for himself the relations of the strata in bay and promontory, in hill and valley; if, further, he have an opportunity of examining any volcanic district and the relation therein of beds and dykes of lava to accumulations of ashy débris; and if he become practically acquainted with a district in which, as in Dartmoor, great bosses of granite or other plutonic rock rise up from amid surrounding strata; if he have thus laid the foundations in practical observation, and stored his mind with sense-images and with perceptual ideas, then he is in a position to apprehend any geological description, whether the district described be in Africa, Asia, or America. Without some such preparation he will have no realizing apprehension of descriptions, no matter how vivid, since he will have no first-hand experience in the light of which to interpret that which he has not seen for himself, but which is put before him through the description of another.

It is clear from what has just been said that geology is not a subject which, unless in exceptional circumstances, can be extensively utilized in affording a training in observation as preparatory to and associated with the apprehension of description. There is no subject which, for this purpose, is more convenient than elementary, observational, and descriptive botany. The boy or girl who has carefully observed, under guidance, the structure of a few flowers, is in a position to apprehend the description of a great number of flowers. Material for the purpose is readily obtainable. The relations to be perceived do not present great difficulties; and the parts

can be dissected without that messiness which makes zoological dissection insufferably distasteful to many people. Furthermore, such observation and the apprehension of description will lend a fresh charm to field and hedgerow and garden, and will lead up to the comprehension of generalizations of wide range and of deep interest. For in every stage of mental development, observation, the apprehension of description, and the comprehension of explanation should be made continually to play into each other's hands. If observation leads up to apprehension, this faculty in return quickens observation ; if apprehension is the necessary precursor to comprehension, this faculty gives a new meaning to all that is apprehended, and a new zest to individual observation. The teacher who realizes this will so arrange his course of instruction as to afford opportunities for the interaction of the several faculties employed.

To observation in certain subjects we are able to add *experiment*. In experiment we employ special means to facilitate the observation of particular phenomena. It is a means of analysis by which the phenomena we wish to observe are, by artificial methods, rendered predominant and brought within easy reach of perception. There are certain phenomena of nature which, by reason of their magnitude, or by reason of their minuteness, by reason of the slow sweep of their rhythm, or by reason of the extreme quickness of their rhythm, do not readily come within the range of our perception. These may be illustrated by experimental methods. Other phenomena, by reason of their intricacy under natural conditions, are difficult of observation. Experiment

gets rid of the disturbing factors, brings out into artificial prominence that which we wish to study, and thus renders the exact observation of this predominant factor less difficult.

Elementary physics and very elementary chemistry are, of all subjects which deal with natural phenomena, the best for the purpose of affording a training in the experimental method. The experiments should, so far as possible, be from the first exact and quantitative, so as to afford a training in the perception of numerical and quantitative relations. Let us consider a simple example in some detail, for the purpose of illustration. We take a lath of boxwood, two feet long, to act as a lever. Across the middle on the lower side is a notch which fits on to a triangular fulcrum. The upper surface of the lever is marked with a scale of inches, extending on either side of the middle line above the fulcrum, and numbered from this line outwards. We have also a box of weights—10, 20, 30, 50, 60, and 100 grains. We now make experiments in balancing the weights on the lever. We take first the 10 gr. and the 20 gr. weights. Placing the 10 gr. at the end of the lever on one side, where it is marked 12, we at first put the 20 gr. weight in the same position on the other side. The 20 gr. weight outbalances the 10 gr. We shift it along towards the fulcrum, and find that, when it just balances the 10 gr., it is exactly over the 6 inch mark—that is to say, it is half the distance from the fulcrum of the 10 gr. weight. We then put the 30 gr. at the end over the 12 inch mark; and, taking the 60 gr. weight, shift it too along the lever. It balances the 30 gr. so soon as it is over the 6 inch

mark. So that in each case the double weight is at half distance. We at once try the 100 gr. and 50 gr. weights in a similar manner, and see that they exemplify the same rule. Then we put the 30 gr. at distance 10 and the 60 gr. at distance 5, and again find that they balance. We try the experiment in a number of ways; and, finding the rule always holds good, we lead the pupil on to the generalization—The double weight must always be placed at half the distance. When this has been comprehended, we may put the experiment on one side, and *describe* that if we put the 10 gr. weight at the end of the lever, over the 12 inch mark, we must place the 30 gr. weight over the 4 inch mark on the opposite side. When the description is apprehended, we may show the experiment, and allow observation to confirm the description. By further descriptions, confirmed in each case by observation, we may lead up to the wider generalization (if the pupils are at a sufficiently advanced stage to comprehend it)—That the distance is always inversely proportional to the weight, exemplifying the generalization by describing how 3 times the weight must be placed at $\frac{1}{3}$ of the distance; 4 times the weight at $\frac{1}{4}$ of the distance; and bringing it home to observation by placing the 10 gr. at one end over the 12 inch mark, and the 60 gr., which is 6 times the weight, over the 2 inch mark, which is $\frac{1}{6}$ the distance, and showing that they balance. With more advanced pupils it may be shown, by balancing the lever on a piece of string instead of a fulcrum, that when the weights balance they swing evenly round the central point, the smaller weight performing the larger circle, the greater weight a less circle.

This central point is called the common centre of mass of the system. And in this way the experiment may be made to illustrate the fact, that the earth and moon are swinging round their common centre of mass, which, since the mass of the earth is 80 times that of the moon, is 80 times nearer to the centre of the earth than to the centre of the moon.

It is not infrequently the case that when certain natural phenomena have been carefully observed and accurately described, two or more alternative explanations are possible. Such alternative explanations are termed *hypotheses*. To decide between them, we need what is termed a *crucial* observation or experiment. We see, for example, the sun, moon, stars, and planets rise in the east, sweep across the heavens, and set in the west. Now, it is a generalization from a great number of observations, that the apparent movement of a body external to ourselves may be due (1) to the actual movement of that body while we are stationary, or (2) to our own actual movement, the external body being stationary, or (3) to the difference between its movement and our own. The apparent diurnal movements of the sun, moon, and stars may be due, then, to the rotation of the heavens round the earth, or to the rotation of the earth, or to a difference between the rotation of the heavens and that of the earth. These are the alternative hypotheses on which the observed phenomena may be explained. In times gone by the generally accepted hypothesis was that the heavens rotated around the earth. Now, as we all know, the accepted hypothesis is that the earth rotates on its axis once in about twenty-four hours. What has convinced us that this is

the true explanation ? What was the crucial observation or experiment ?

Suppose we set a pendulum swinging quite freely. Then the direction of the plane of its swing will remain unaltered unless something interferes with it from without. Why should it alter ? There is no generalization which enables us to answer this question except by saying that there is no reason why it should alter ; but, on the other hand, there is a very wide generalization to the effect that bodies remain in their state of rest or of uniform motion, except in so far as they are influenced from without. Let us, however, put the matter to the test of experiment. Set a pendulum (a weight at the end of a fine thread will serve the purpose) swinging in a cage or in a pail. Now, while it is swinging, turn the cage or the pail round, making the point from which the weight is suspended the axis of its rotation. You will find that the plane of swing remains unaltered in direction. Thus we obtain experimental proof of the constancy of the plane of oscillation. We are now in a position to apply experiment to our special problem. A long heavy pendulum is suspended from a lofty ceiling, with special precautions to secure perfect freedom of oscillation ; if now this be set a-swinging at 12 noon, and the direction of its swing be carefully noted, by stretching a string, for example, beneath and parallel with the swinging-point ; and if, after leaving it for three hours, the pendulum and the string be again observed, it will be found that the point is no longer oscillating parallel with the string, but across it at an angle the precise value of which depends on the latitude of the place. Since, then, the plane of oscilla-

tion of the pendulum has remained unaltered, it must be the string that has moved. But the string was fixed to the floor, and the floor to the solid earth. Hence it is the earth that has twisted round. And it can be shown that the amount of twisting is just that which should be produced if the earth is rotating once on its axis in twenty-four hours. This was the great French physicist Foucault's crucial experiment. There are others; but this suffices for purposes of illustration.

The validity of an explanation may thus be established by means of a crucial experiment or observation. Let us now pass on to consider the special form in which an explanation, so established, may be justified at the bar of reason. This will enable us to see the nature of those relations which we termed the logical relations.

We have seen that explanation consists in a reference from the particular to the general. We explain, to take a homely illustration, the mauled condition of the fish on our breakfast-table, by saying that the cat had been there, and confirm our explanation by the crucial observation that one of her footprints is impressed on the tablecloth. But this would be no explanation, though it might be a description of what had taken place, if such thievishness were not a general characteristic of ill-trained cats. Suppose that a particular phenomenon, concerning which we are impelled to ask the question "Why?" is altogether isolated, and cannot be brought into touch with any known generalizations; then concerning it we can only say that we are at present unable to explain it. The most we can do is to describe the facts, and hope

that they may be explained hereafter by the discovery of their relations to some of the generalizations which form part of the body of assured knowledge.

Explanation, then, being the reference of the particular to the general, it becomes our duty to set forth the nature of the generalization and the relation of the particular thereto in the clearest and most effective manner, in order that the grounds of our reference may be made apparent and our explanation justified to reason. This is done by means of a series of propositions arranged in a special way, or in special ways. A proposition is a direct statement arranged in the clearest and most perspicuous form. Grammatically, the proposition consists of subject and predicate, together with certain words or phrases which qualify or amplify the one or the other. And here it may incidentally be said that grammatical analysis is of the utmost service in enabling the pupil to perceive the relations of words in a proposition, these relations being the reflection in language of those which are observable in that experience which language seeks to describe. The subject of the proposition, which, as before noted, must be carefully distinguished from the subject of consciousness, indicates that of which something is to be predicated, or that concerning which the proposition is to be made. In logic the subject and predicate are spoken of as the *terms* of the proposition, and between the terms is placed the *copula*. In affirmative propositions the copula is the word "is" or the word "are"; and it is customary to bring any proposition which is to be employed in logic into such a form as to give the copula its distinctive position. Instead of saying,

"Fish live in water," we should, in logic, say, "Fish are aquatic animals." Thus we have (1) the subject of which an assertion is made; (2) the predicate indicating what is asserted; and (3) the copula symbolizing the act of assertion. It is sometimes said that the copula links together the terms of the proposition. And this is in a sense true; the copula does link the terms in the written or spoken proposition. But if we regard the proposition as expressive of a judgment, we must be careful to remember that the judgment is one and indivisible, and that the terms are reached by analyzing it. Hence the copula is to be taken as the symbol of the unity of judgment in the midst of the diversity of terms which analysis serves to distinguish.

In the logical *syllogism* three propositions, containing three, *and only three,* terms are brought into relation under certain formal rules. These rules we cannot here attempt to discuss; nor can we consider the different kinds, or figures, of syllogism. It must suffice to give a simple example in the first figure. Take the syllogism—

All rodents have chisel-teeth;
The mouse is a rodent;
Therefore the mouse has chisel-teeth.

The final proposition is called the *conclusion,* and the other two from which it is derived are called the *premises.* The predicate of the conclusion is spoken of as the *major term,* the subject of the conclusion being called the *minor term,* while the third term which forms the subject of the first proposition, and the predicate of the second, is known as the *middle term.* The premise which contains the major and

middle terms is called the *major premise*; that which contains the minor and middle terms, the *minor premise*. It is convenient to express the syllogism in its most generalized form by using symbols for its terms. Thus, denoting the major term by P (because it is the predicate of the conclusion), the minor term by S (as subject of the conclusion), and the middle term by M, and representing the copula by . , we have the following generalized form of such a syllogism in the first figure of formal logic—

M . P ;
S . M ;
∴ S . P.

S . may represent a concrete object and be expressed by the indicating word "this." Thus—

Hive-bees are stinging insects ;
This is a hive-bee ;
Therefore this is a stinging insect.

The educational value of elementary logic, like that of the analysis of sentences, consists in the discipline it affords. It should be employed as an exercise, first, in converting assertions, made in the varied modes of literary or scientific expression, into propositions in logical form ; and, secondly, in throwing into syllogistic figure the conclusions reached by inference. "You obtain the most vital idea of inference," says Mr. Bosanquet, "by starting from the conclusion as a suggestion, or even as an observation, and asking yourself how it is proved or explained. Take the observation, 'The tide at new and full moon is exceptionally high.' In scientific inference this is filled out by a middle term. Thus the judgment pulls out like a telescope, exhibiting

fresh parts within it, as it passes into inference. 'The tide at new and full moon, *being at these times the lunar tide plus the solar tide,* is exceptionally high.' This is the sort of inference which is really commonest in science."

Now, the validity of the syllogism and of the inductive process by which its major premise is reached, and the validity of the whole process of inference which is therein stated in logical form, rests upon the assumption of the uniformity of nature—an assumption which does but universalize the generalizations of experience. It is quite clear that if the operations of nature are not uniform in the matter of hive-bees, I can neither assert with any confidence that all hive-bees sting, nor have any assurance that this hive-bee stings, since it may happen to be one of the exceptions to uniformity. Secondly, this validity rests upon the uniformity of thought. If our concept hive-bee is not uniform but fluctuating, if it have one meaning in the major premise and another in the minor premise, there will be no certainty in the conclusion. Thirdly, this validity rests upon the uniformity of language, or of the terms in which we express our thought. If the word "hive-bee" be not uniformly associated with one concept, it may mean one thing in the major premise, and another in the minor premise, whereby our conclusion loses all certainty. *Uniformity of nature, uniformity of thought, and uniformity of terminology; these form the tripod upon which the "therefore" is firmly supported.* The uniformity of nature is beyond our control: it is through failure in preserving uniformity of thought or of terminology that we are

apt to go wrong in reasoning. If, for example, we use the word "hive-bee" in the major premise as inclusive of working-bees, but in the minor premise as inclusive of the whole colony of bees in a hive, queen, drones, and workers, then our conclusion may or may not be true. If it is a queen or a working-bee, it stings; if it is a drone, it does not sting. Such failures in preserving the uniformity of our thought or of its expression are the source of what are termed *fallacies*. One of the main advantages of the syllogistic method of statement is that it enables us more readily to detect such fallacies. If we say—

All laws are enactments;
Universal gravitation is a law;

Therefore universal gravitation is an enactment;

our reasoning involves a fallacy. For we are using the word law in two different senses, or for two different concepts. Human laws—laws in the legal and constitutional sense—are enactments; but natural laws are generalizations from experience.

We are now in a position to define the terms *reason* and *reasoning*. *To reason is to pass from proposition to proposition* (or their equivalents in thought) *with definite consciousness of the logical relations involved.* It presupposes a conception of the logical relation expressed in such words as "therefore" and "because," and a perception of its application in particular cases. Reason may thus be concisely defined as *the faculty by which we conceive and perceive therefore*. To jump to conclusions, be it never so accurately, is not to reason; to profit by the association of sense-experience, be it never so cleverly, is not to reason. Either of these processes may be per-

formed without any conception or perception of the logical relation, as such. But when once the child can conceive and perceive "therefore," he has become a rational being.

CHAPTER VII

MENTAL DEVELOPMENT

We have been dealing in the last five chapters with some of the factors of mental development on its *cognitive* side, which comprises those conscious activities which lead up to intellectual knowledge. Let us now look at mental development as a whole, reviewing briefly what we have learnt concerning the cognitive aspect of our conscious life, and introducing some reference to the emotions and the will.

The first thing to notice is that mental development is in many respects analogous to bodily development. Each is a process of natural growth. Our minds assimilate the results of our experience just as our bodies assimilate the products of digestion. In each case we are presented with the raw materials which may be elaborated into the corporeal body on the one hand, or into the mind and body of consciousness on the other hand. The body is, however, a visible, tangible entity; while the mind is in its essential nature invisible and intangible. The body is actually existent at any moment in its entirety; the mind has, for psychology, only a potential existence in its entirety. What is actually existent beyond all question at any moment is the state of consciousness:

the rest of what we call the mind, with all its stores of experience, is not—or, let us rather say, need not be for psychology—actually existent; it need only have a potential existence, in that the conditions for its emergence piecemeal into consciousness continue to exist during healthy life. The question of the existence of the mind as an entity, not only distinct from but separate from the body, is a philosophical question into which we cannot enter here. It suffices for purposes of purely psychological description and explanation to assume that the continually existent conditions are organic, and that the brain affords a physical basis for all that we experience in our states of consciousness. And in any case it is a practically observable fact that the maintenance of a healthy and vigorous condition of the body, including the brain, is essential for the healthy growth and development of the mind.

Body and mind, then, are alike the products of what we may term a *natural synthesis*. Remember, however, that we must distinguish this use of the term "synthesis" for the designation of a natural process, from our previous use of the same word for the conscious and intentional putting together of the results of our psychological analysis. That was a voluntary process; this is a process which is involuntary, and has its roots deep down amid, not only the organic, but even the inorganic operations of nature. The union of elementary substances to form a chemical compound, as in the case of the carbon that burns to form carbonic acid gas; the grouping of molecules to form a crystal, as in the case of the crystallized sugar obtained by slowly evaporating syrup;

the formation of blood, muscle, bone, and other organic tissues, as in the case of the hen's egg, which after three weeks' incubation becomes a fully-formed chick ; these all illustrate the operations of a process of synthesis which appears to be one of the widest and most universal laws of nature, or generalizations from experience. Body and mind are, I repeat, alike the results of an analogous process of natural synthesis. And my motive for thus emphasizing this fact is that we may clearly understand what the teacher may hope to do, and what he must not hope to do, if hope is to be followed by fulfilment.

The office of the teacher is to supply the most favorable conditions for the natural process of mental development. What we may hope to do is thus to minister to nature : what we must not hope to do is, as the proverb has it, to make a silk purse out of a sow's ear. We can do little for the geniuses, except to be very careful not to stand in their way ; we cannot do much for the dunces, except to help them to realize where their weakness lies, and where their strength—for your dunce intellectually is often capable of excellent work of the right sort ; our real field of effort lies among the mediocrities, those who are gifted with average faculties, which they would fail to develop without assistance and guidance. Our office is to encourage the development of these faculties, and provide the proper raw material on which they may exercise their elaborating power. Here, again, the analogy of bodily development is helpful. We give a child the opportunity of assimilating the right sort of stuff ; we withhold noxious materials ; and the child grows and develops. This

is a purely individual matter, and cannot be performed vicariously. So, too, we may give a child the opportunity of assimilating the right sort of experience, and withhold noxious experience. But the actual process of assimilation, that must be left to the child and to nature. We may minister to nature, but we cannot perform her office. There is one thing, however, that we unfortunately can do. We can induce a child to take into his mouth, with no attempt at assimilation, a number of phrases which sound like knowledge : which are, indeed, the products of knowledge, but not *his* knowledge, since they have never been digested and assimilated by him. This is cramming. The stuff so crammed is like the earthy substance some savages are said to give to their children, which does but swell out their little stomachs without ministering to digestion. To provide this is *not* the office of the teacher. He insists, indeed, upon a good deal of rotework and getting by heart, but all with the end of true assimilation in view.

And it is the office of the teacher to supply the conditions for *all-round development*. We are terribly apt to get mentally lopsided. We are almost sure to become so, more or less, when we come to what are termed—often, alas ! with hidden irony—years of discretion. The teacher should do his best to see that those to whose mental development he ministers shall, at any rate in the early stages of growth, have opportunities of development in all reasonable and right directions.

Let us now revert to the fact, so often insisted on, that the state of consciousness includes not only a focus, but also a margin ; not only the central object

of consciousness, but a background in which that object is set. The state of consciousness at any moment in any individual is a complex product which is dependent upon the whole previous mental development in that individual. The objects of sense, as such, undergo little or no change from our early years till our old age, when the organs of sense are becoming enfeebled, and their products in consciousness are growing dim. The objects of perception and conception change little from youth, when our mental powers are mature, to the end of our life. But the background in which these objects are set—that changes as the months and years roll by ; and with it, of course, the relation of the focal object to the marginal background. It is the nature of the mental background that determines the temperament we are of, and the mood we are in ; sickness or health, freshness or fatigue, affect the background to a far greater degree than the actual focus of consciousness. The mental background is the seat of the character ; herein lies our wisdom or our foolishness, our stability of purpose or our weakness. This it is which, in any moment of consciousness, is enriched from our stores of memory through associations by contiguity or suggestions by similarity in any moment of consciousness. And this it is to the development of which the teacher should minister.

In the last five chapters we have been dealing chiefly with the focus of consciousness ; for though it is by no means universally true that it is only through the focal gate that elements of consciousness can gain admittance to the marginal background, still it is true that a very large proportion of the background

has passed through that focal gate. It is chiefly with the focus of consciousness, too, that the teacher can directly deal; but he should so deal with it as to have constant reference to the development of the mental background. For, as we claim, the province of education is to cultivate the mind as a whole; but the mind as a whole is a potentiality of existence of which the mental background in any moment of consciousness is, for psychology, the actually existent sample. The background in which the object is set is, at any given moment, the actual representative of all the potentiality of the mind. What is to be said in this chapter in further elucidation of mental development must have reference largely to the background of consciousness.

First let us inquire what we inherit. What is our mental stock in trade to start with? It may sound paradoxical to answer, Our mental stock in trade is a body and brain. Such answer, however, probably best indicates the facts. We do not come into the world with any actual mental stock in trade, but in body and brain we inherit the potentiality of all our future mental development. If objection be taken to the word "potentiality," let us substitute for it the phrase "organic conditions." The matter may perhaps be made clearer by an analogy. We may liken the mind to the flower of our life's growth. Now, the seed and seedling inherit no actual flowers; but it inherits certain organic conditions which render the development of flowers in due course a matter of natural sequence. And the nature of these flowers down to the minutest details is, except in the matter of differences individually acquired, part of its natural

heritage. In like manner the body and brain are the organic basis and condition of the future mental development; and this is what the babe inherits. But here too the flower of his mental growth down to the minutest details is, except in the matter of differences individually acquired, part of his natural heritage. He inherits no visual ideas, no auditory ideas, no ideas of touch, taste, or smell; but he inherits the conditions for the occurrence of sense-impressions; and as the special senses are called into play by the stimuli of the surroundings, sense-impressions are produced, and the development of sense-experience commences. We know very little concerning the exact manner in which the ordering of sensory data into a consistent body of sense-experience takes place; for this ordering is well established by the time we are two years old, and this period marks for most of us the extreme backward limit of memory. But during this period there has been developed in some way, by some process of natural synthesis, a body of sense-experience which in any moment of consciousness furnishes a sensory background in which new sense-impressions are set, being thus raised to the level of what we termed *sencepts*, and to which these new impressions bear definite relations, though these relations may not as yet be definitely perceived.

But not only do the special senses contribute data to sense-experience. Our bodies respond to the stimuli they receive, and respond in ways which are from the first more or less definite through inheritance. Such responses, when they are from the first quite definite, are termed *instinctive*. The more complete the organic development of an animal at

birth, the greater the number of definitely instinctive activities it inherits. The bee emerges from its chrysalis sleep in a highly developed condition, and at once performs its instinctive activities. Many instinctive activities are observable in the newly-hatched chick. The human infant is relatively far less perfectly developed. There are fewer definitely instinctive activities. But the child inherits innate tendencies to respond to stimuli in more or less definite ways. These are accompanied by consciousness. The net results of complex activities—that is, activities which involve a complex play of muscular contractions—stir our consciousness as wholes, not in their varied details. Using the word *feeling*, in its most inclusive sense, for any element or group of elements in consciousness, we may apply the term *activity-feelings* to the effects in consciousness of active responses to stimuli. These activity-feelings, the conditions of which are inherited, are woven into the body of sense-experience, in the process of natural synthesis, and become ordered in due relation to the data afforded by the special senses. Thus the sensory background in which new sense-impressions and new activity-feelings are set, and to which these new objects of consciousness bear definite relations, is already of considerable complexity, comprising not only data afforded by the special senses, but also data afforded by the motor elements, all of them duly ordered into a self-consistent whole.

We have now briefly to consider these states of consciousness from a different point of view. Hitherto we have been regarding them in their cognitive aspect. The term "cognitive" is perhaps in strict-

ness to be applied only to that which concerns knowledge ; and knowledge, as we have seen, involves conception. We may, however, conveniently extend the term "cognitive" to that aspect of sense-experience which is the precursor of knowledge properly so called. If we do not adopt this plan, we must coin some such new term as "pre-cognitive"; and we have terms enough to deal with as it is without inventing new ones. The cognitive aspect of experience with which we have been dealing gives the form and grouping of the picture of consciousness ; the emotional aspect, to which we must now turn our attention, gives the color and tone of the picture. And just as the artist in oils uses the same materials to express both form and color, so it is in consciousness. The same impressions and ideas in the focus, the same background of sensory and motor elements, which we have been considering in their cognitive aspect, present us also with the emotional aspect, when we fix our attention not on the form and grouping, but on the coloring of the mental picture. We have not to deal with a new group of emotional impressions and ideas, but with a new aspect—one which we have so far intentionally neglected—of our states of consciousness. It is now our duty to make this aspect predominant through analysis.

We may speak of the coloring of our states of consciousness as *emotional tone*. The phrase is by no means altogether satisfactory, but it may serve till some other wins its way to general acceptance. It includes not only that coloring which we describe as pleasurable and painful, but also a great number of shades which are, so to speak, made of the same stuff as

pleasure and pain, but which could not be grouped under either of these heads. It is difficult to say whether anger and pity, both of which are suffused with emotional tone, are pleasurable or painful. They may be either, or neither, or perhaps both ; for there is a painful pleasure in anger, and a sweet pain in pity. What we speak of as excitement may be pleasurable, or painful, or neither the one nor the other, and yet full of emotional tone.

It is characteristic of emotional tone that it diffuses itself over the whole state of consciousness. Pain, especially acute pain, due to some definite organic mischief, such as a deep cut or a toothache, may be concentrated in the focus of consciousness ; but this acute pain due to physical injury should, I think, be placed in a class by itself, and distinguished from the more general emotional tone with which we are dealing. Setting that aside, it is, I repeat, characteristic of emotional tone that it is diffused over the whole state of consciousness. And this is especially true of those states which are *par excellence* termed the emotions. Much may, indeed, be said in favor of the view, to which I personally more and more incline, that the emotional tone is mainly, in such cases, a matter of the background of consciousness. What is in focus is the object which excites the emotion. One object excites anger, another surprise, another fear, another interest, another aversion, and so on. Each calls up its special background, and therein, of course in its relation to the focal object, lies the main body of the emotional tone. And this emotional tone is very largely, probably we may say predominantly, associated with what we termed activity-feelings,

either presentative or re-presentative. Thus the emotion of anger involves the re-presentative suggestion, in the background of consciousness, of those activity-feelings which accompany certain forms of vigorous action to which we have an innate tendency. When this re-presentative suggestion is strong, there follows a faint repetition of this action, which is termed the "expression of the emotion." And this faint action presentatively strengthens the re-presentative emotion. Thus by action and reaction we may, as we say, work ourselves up into a passion. The emotion of dread involves the re-presentative suggestion of that state of muscular collapse which would appear to be in the first instance a purely organic and physical effect. When this re-presentative suggestion is strong, there follows a faint tendency to such collapse, and this again presentatively strengthens the re-presentative emotion. We call this "giving way" to the emotion; and it is well known that such giving way may result in complete collapse. The emotions, then, in so far as they are due to activity-feelings in their aspect of emotional tone, may be either presentative or re-presentative, or partly the one and partly the other.

Now, the *control* of which we spoke in the third chapter is essentially a motor control. Whether we can control the course of our thoughts is a matter upon which there is want of agreement. But all agree that we can exercise motor control over our muscular activities. Note, then, the bearing of this fact upon what is termed *self-control* in the matter of the emotions. It may be doubtful whether we can exercise control over the emotion as purely re-

presentative, but there is no doubt that we can exercise control over the motor expression of the emotion. We can check that clenching of the fists, setting of the teeth, and general tightening up of the muscles, which anger as re-presentative tends to call forth. We thus prevent that reinforcement of the emotion by the addition thereto of presentative elements, which leads to the passion gaining sway over us. So, too, with grief. We cannot, when death has snatched from us our nearest and dearest, banish sorrow from our mind; memories crowd in on the background of our consciousness and will not be gainsaid. But we can exercise self-control over the expression of our grief. These are elementary and familiar facts, but they should be steadily borne in mind by the teacher. That habits of self-control can be acquired stands almost beyond question. It is the office and privilege of the teacher to assist in and encourage the acquisition of such habits.

The introduction of the element of control has led us on to the third point of view from which states of consciousness may be considered, that of *volition* or *the will*. Authorities differ as to whether or not there are special elements in consciousness due to the exercise of control. Personally I am inclined to believe that there are; but the matter is too technical for discussion here. Nor is such discussion needful; for the will is essentially a practical faculty. Let us, however, note clearly the relations of what we have termed the three aspects of the state of consciousness. The cognitive aspect is essentially objective; it deals with the object of consciousness in relation to the existing mental background. The emotional aspect

is essentially subjective; it deals with the emotional tone of our own states of consciousness. It is the fountain-head of action, and leads, if unchecked and uncontrolled, to that mode of activity which we term *impulsive*. The volitional aspect is essentially active and controlling; it is in close touch with the cognitive objective aspect on the one hand, and with the emotional and impulsive aspect on the other hand; it holds impulse in check in the light of an extended cognition. The impulsive emotions are like spirited horses in the coach, or more prosaic omnibus, of life; volition is the coachman, now reining in and now whipping up the horses. Both the horses and the coachman employ their cognitive powers, but the latter with wider view and more foresight. And any mismanagement or upsetting of the coach or omnibus may damage many people, and be a social evil. Even if we are independently driving our own dogcart, mismanagment may derange the whole traffic. The analogy is not altogether satisfactory; we must fuse our coachman and horses into a sort of mythical centaur, to represent the essential unity of consciousness in its three aspects, cognitive, emotional, and volitional.

The practical word of advice in the matter of the training of the will is—Remember that control is, at any rate primarily, a faculty that deals with motor activities. And remember that it is in trivial matters and unessential activities that a power of control can most readily be acquired. Do not expect your coachman to hold in check a spirited horse, if he have had no practice on inoffensive donkeys, quiet old ponies, and easy-going cobs. Do not expect a

lad to exercise self-control in the stress of strong temptation and hot impulse, if he have had no training in motor control when the temptation was scarcely felt and the impulse no stronger than a slight leaning or inclination. Just as habits of obedience are fostered by insisting on absolute conformity to our instructions in all things, no matter how unimportant; so are habits of self-control fostered by encouraging frequent exercise of the faculty in the little daily actions of ordinary life, no matter how trivial.

Let us return now to the cognitive aspect of states of consciousness. For the affording of training in matters of skill we speak of *instruction*, with its accompanying *practical demonstration*. We also speak of demonstrating a theorem, say in Euclid. This process consists in proving, in particular instances, the validity of a generalization which is clearly and concisely enunciated. The two uses of the word "demonstration" should be carefully distinguished. Practical demonstration consists in showing how a thing is to be done, instead of only describing how it is to be done. Its correlative is *imitation*. In that branch of education which comprises instruction in matters of skill, a little practical demonstration is more helpful than much description. For the perfecting of skill, continued practice is essential. The accomplishment of a skilled act is usually accompanied by the emotional tone of satisfaction. The child is, however, apt to be somewhat easily satisfied; and it is the office of the teacher to lead his pupil on to be satisfied only with the best performance. One of the characteristics of a successful man, in the truest sense of the word "successful," is that he is

dissatisfied with even his best performances, and seeks to attain satisfaction by bettering them. This is that "noble discontent" which constantly spurs a man on to higher and more strenuous endeavor. It should therefore be the aim of the teacher to foster the development in the background of consciousness of this right and helpful sort of dissatisfaction which prompts to higher perfection. The healthy competition of games is of great value in contributing to this development. This is one of the points in which the educational influence of our great public schools is so valuable. And since all improvement in skill is effected through the application of motor control, it is clear that we have here also a wide field for the training of the will. Lack of improvement is often due to mere weakness of will; there is an amiable wish to do better, but the application of control is wanting. Whether a teacher can do much to strengthen a naturally weak will is a question that is perhaps open to discussion. But he can, at any rate, encourage control in matters of skill in which the opposing force to be overcome is rather indolence than strong emotional impulse.

We may apply the term *information* to that which is given and received through oral or written description. Those who can readily absorb and retain the information imparted to them may be said to have good powers of *receptivity*. It may perhaps be said, without either injustice or exaggeration, that of all branches of modern education this is the easiest, the commonest, and the least valuable from the standpoint of mental development. People nowadays, of all ages and of all classes, are athirst for information,

and the means of providing it are multiplied exceedingly. Nor should we undervalue such information. It is the stuff of which knowledge is made, or, let us rather say, the stuff which, in correlation with individual observation and individual generalization, contributes to the making of knowledge. There is, moreover, no more delightful companion than the well-informed man. But it is only one factor, and that not the most important factor in education. The danger is lest it should be regarded as all-sufficing.

Assigning to it, therefore, its true place in the educational scheme, encouraging the constant checking of information by personal observation whenever opportunity occurs, and insisting upon the due exercise of the generalizing faculty of conception and the particularizing faculty of perception on the materials supplied through the channels of information, it is the office of the teacher to do all in his power to see that the information is accurate and thorough. Information is mainly descriptive. The demand for it implies a special attitude of mind, which we may term the "how" attitude. This is most valuable. We ought to endeavor to establish in the minds of our pupils a permanent background of "how?" so that of every object we see and of every fact we are told, the question, How is it related to other objects or to other facts? at once suggests itself. If possible, it is better to answer the question "how" by observation; but, failing that, information must be accepted as a substitute. The emotional tone associated with the "how" attitude is what we term *interest*. And the importance of interest in education is too familiar

to need special illustration. What I am here anxious to show is that this "how" attitude, with its emotional tone of interest, should be so woven into the margin of consciousness as to become part of the permanent mental background of character.

Before passing on to point out that we should endeavor to establish not only a "how" attitude with its descriptive interest, but also a "why" attitude with its interest in explanation, a few lines may be devoted to the importance of correlating the faculties of observation and description. It is one thing to observe well, and another thing to describe well the observations we have made. But for purposes of knowledge, which is not only a personal and individual matter but of general and social validity, individual observation has to be translated into accurate description in order that the results of the observation be rendered socially accessible. Hence the pupil should be trained not only to observe but to describe his observations. When such correlation of the two faculties has been established, not only will observation tend to clothe itself in description in the moment of practical experience, but description, read or heard, will tend to call up images of observations similar to those that are described.

What was spoken of just now as the "why" attitude is analogous to the "how" attitude; but it requires not a descriptive answer, but an explanation. Such a mental attitude is natural to a rational being. But there are many people, old as well as young, who appear to have a much keener appetite for scraps of information and superficial description than for either thorough information, full and ac-

curate description, or explanation in any of its wider and deeper phases. The minor newspapers, that consist of a heterogeneous and disjointed series of snippets, minister to and encourage this kind of mental appetite, and foster a flabby and inconsequent habit of mind. Furthermore, the constant reading of a number of scrappy paragraphs, the contents of which one has neither the wish nor the intention to remember, weakens the memory, while it impairs the mental digestion. The encouragement of the "why" attitude and of the desire for explanation may do something to check this tendency, and may foster the development of a logical background. For just as the "how" attitude at its best leads up to habits of exact observation and accurate description, so does the "why" attitude at its best lead up to habits of consistent, logical thought and clear explanation. The rational being, as such, is characterized by the fact that his mental background is ordered in accordance with logical relationships, so that any object of thought or experience at once assumes its true position in a logical field—a field of generalizations which can be rapidly brought to bear upon the particular object immediately in focus.

But there is something which may be ranked higher than reason and the logical faculty, to which reason and logic minister. It is that which in its varied phases is sometimes termed *insight*, sometimes *imagination*, sometimes *intuition*, sometimes *inspiration* (in the non-religious sense). It is perhaps of all mental faculties the most difficult to describe, to define, and to explain. It is that faculty by which new

thought is brought into existence. The thought may not be new to the race, but in any case it is new to the individual. Hence it is rightly termed the creative faculty. Of course the new thought is the product of the interaction of old materials. We have every reason to believe that it is a natural product; we may regard it, in fact, as a specialized result of that process of natural synthesis to which allusion has before been made. Just as from a solution of alum in water, crystals are formed by natural process of synthesis under appropriate conditions, so from a solution of experience in thought new ideas crystallize out under appropriate conditions. The alum crystals are new to that solution, though not new to natural existence; so may the idea be new to the individual mind though not new to human thought. But if we are experimenting with new groupings of old materials under new conditions (as is done daily in chemical laboratories), then there may result crystalline substances new to natural existence. And if new groupings of old experience, including perhaps also new observations, are held in the solvent thought of a mind of exceptional capacity and activity, there may crystallize out ideas new to man.

Insight and the higher creative imagination come, however, too little within the scope of the ordinary operations of the teacher to justify more than a bare mention of them here. In its lower ranges the faculty does concern us in some degree; and a few words concerning intuitive procedure, how it may be fostered, and how it may be brought into relation with other mental processes, will not be out of place. Intuitive procedure is what we commonly term

"jumping to conclusions." The conclusion is often right, though how we reached it, and why we reached it, we are unable to say. Presumably it is largely a subconscious operation, a direct product of the mental background the details of which we are unable to make focal. And probably it is of the same nature as the suggestions by similarity of relationship which were spoken of in the second chapter. Certainly those of whom this mode of suggestion is strongly developed are those who most often exhibit intuitive procedure. Hence to foster the faculty, which in due restraint is a valuable one, we must encourage this mode of suggestion. And we can best encourage it by being careful not to check it, but to guide it. Children are often highly imaginative; and nothing is commoner than for the unimaginative teacher to ruthlessly snub down the imagination of the child—which is, indeed, a delightfully simple operation, requiring neither experience nor tact. No doubt the imagination is often wild and wayward; but our duty is to train it, not to crush it. And unfortunately the former is a far more difficult thing to do than the latter. Snubbing is so easy; the helpful guidance of the imagination so difficult. One cannot give rules for such guidance; it is a matter of tact in individual cases.

But unquestionably reason is the ballast by which the imagination is to be steadied and balanced. The conclusion to which we jump by intuitive procedure must be justified by logic at the bar of reason. We may not know how and why we reached the conclusion in the first instance; but we must be able to show how and why that conclusion may be justified and

proved to be valid. Thus logic is the afterthought to insight. Thus reason ministers to inspiration. The wild and wayward flights of imagination must be restrained within the limits of either the natural relations of the universe in which we live, or the assumed relations of the universe our imagination creates. In a word, the products of the imagination must be self-consistent. *Paradise Lost* is one of our most splendidly imaginative poems; but it is also wonderfully self-consistent. Lofty imagination, rendered self-consistent by reason, is the attribute of what we term genius.

The creative imagination of the great artist, be he poet, painter, musician, or other, carries with it a special quality of emotional tone; while the receptive imagination of those to whom his art appeals, carries with it the same quality. This is what is termed *æsthetic* tone. Like emotional tone in general, of which it is a species, it is mainly a matter of the mental background. We feel on reading a poem, looking at a picture, or hearing a symphony, that the whole body of our consciousness is thrilling with emotional tone. We shall return to this point in the ninth chapter, when we shall consider literature as an example of art, and shall say somewhat more concerning the special nature of the æsthetic tone which it calls forth. It is one of the richest products of mental development; we should do all in our power to foster it.

And in the creative imagination of the great artist the influence of the will and of self-control is shown in the self-consistency enforced on the product in conformity with the dictates of reason. Nowhere

more completely than in the works of the great artist do we see cognition, emotion, and will conspiring to reach the highest product of mental development. If we can only get our pupils to sit at the feet of these great masters, to breathe somewhat of their spirit, and to learn of them, we shall be doing for them the best that can be done. The teacher should be to the taught the faithful interpreter of nature and of art—an intermediary whose office it is to show the pupil how to learn for himself at these two fountain-heads.

Nothing has been said, unless indirectly, on one most important aspect of mental development—the social aspect. That will be reserved for special consideration in the last chapter. Enough has perhaps been adduced in this chapter to show that mental development is not only a matter of cognition, but also of the emotions and the will ; that it is not only a matter which concerns the focus of consciousness, but that it is mainly a development of that mental background which is, at the moment of consciousness, the actual representative of the whole potentiality of the mind.

CHAPTER VIII

LANGUAGE AND THOUGHT

EDUCATION begins in the nursery. There the child acquires his first practical acquaintance with the natural and other objects by which he is surrounded. He senses, though he may not yet be able to perceive, the relations which they bear to himself and to one another. There the raw material of knowledge and thought begin to accumulate. At the same time, the child grows up in what we may term an atmosphere of language. He is not only directly taught the use of words through association by contiguity with objects of sense-experience; these associations are also established indirectly and incidentally—that is to say, without intentional instruction, the word-sounds continually falling upon his ear in close connection with visual or other impressions.

Presumably the first associations of this kind are between objects of sense-experience (*sencepts*) and the words by which these objects are symbolized. That is to say, those words and parts of words which are expressive of relations have probably for the little child no meaning. They are mere surplusage of sound, conveying nothing, of no suggestive value. So soon as the child begins to speak he passes from

the condition of being a mere recipient of oral communication to that of being himself a communicator. Words become for him a means of more complete intercommunication. The words that he first employs are indicative either of objects of sense or of such actions and activities as are objects of sense-experience ; such objects, or the states of consciousness in which they are focal, being probably strongly tinged with emotional tone. This stage of the use of words—for we may hardly yet call it the use of language—may be termed that of *indicative communication*. When the child says "up," for example, that word is indicative of a certain mode of sense-experience—the experience of being lifted—which is also, through its emotional tone, an object of desire, to use this word in a broadly inclusive sense. We must not be misled by the fact that the word "up" is used as a preposition, into saying that the child is here employing a preposition. It is not used by the child as a preposition. Nor must we say that the child is condensing a sentence into one word, and that this word is really equivalent to "I want to be lifted up." The child is not expressing the adverb of a sentence, the rest of which is unexpressed. Nor is the word to be regarded as a sentence, but simply as a definite sound which he has learned to associate with a particular piece of objective sense-experience. We ought not to call the words at this stage of indicative communication nouns or verbs or any other parts of speech ; for the terms, noun, verb, etc., express the relations of the words they name in a sentence. Nor should we call them condensed sentences ; for a sentence is descrip-

tive, and they are merely indicative. We must call them simply indicative word-sounds.

When the child passes beyond the stage of mere indicative communication and begins to talk in sentences, this shows, unless the sentences are merely repeated parrot-fashion, that he is beginning to perceive relations. For since sentences descriptively express relations, it is clear that the relations so expressed must be first perceived. A connecting link between the stage of indicative communication and this higher stage of *descriptive communication,* as we may term it, is when the child puts together in juxtaposition two objects of sense-experience. When the child puts together the two word-sounds, "Bow-wow, bark," he is on the verge of, if he have not actually reached, predication. At first, perhaps, a mere expression through word-sounds of the sensed association of a visual with an auditory impression, it would soon acquire the force of a perceived association; in which case the expression, though not yet a sentence in form, is a sentence in intent. And when once the child reaches this stage, when the perception of relations is dawning upon his mind, there follows a period of marked and rapid progress, partly due to his individual use of perception, partly to the fact that through this perception his teachers acquire a new leverage to lift him up in his onward course of development.

For we teach in relations; and until these relations can be perceived we are able to do little in the way of direct teaching: we must be content to afford material to the child's powers of imitation, since his powers of apprehension are not yet developed. But

when the child's apprehension stretches forth to meet our description; when, partly under the influence of the development of his quickening powers of perception, partly under our guidance in the application of these powers, his restless faculty of observation is directed to the relations of the phenomena of the world around him; and when to perception are added analysis and generalization;—then the child makes rapid progress on the one hand in knowledge, and on the other hand in the modes of expressing that knowledge—in language and thought.

If we look back to the early condition of man, and if we study the, in part primitive, but in part perhaps degenerate, condition of man as he now is in savage races, we seem to find evidence of a stage of human progress when intercommunication was entirely oral—that is, by word of mouth, and not by writing, though this oral communication was probably very early supplemented by pictorial representation. In the caves of France, and in some of the caverns of our own country, there are found, inscribed on bone or antler or tusk, rude representations of animals. The animals so represented are sometimes grouped; and it has been suggested that these incised figures were perhaps not only early efforts towards pictorial art, but were used to convey information, like the message-sticks of some uncivilized tribes to-day. Thus, in one of the French caves (the rock-shelter of La Madeleine, in the Dordogne) there was found a piece of antler on which on one side two large aurochs' heads are represented, and on the other a man is depicted with a weapon or burden on his shoulder. He is meeting horses,

indicated by their heads; behind him is the sea, indicated by incisions representing the waves, in the midst of which is a fish or eel. It has been suggested that all this had a meaning. It may have meant: The tribe whose totem or sign is the aurochs have left the sea, where they have been living on fish, for the prairies, where they will hunt horses. This is, no doubt, conjectural; but the suggestion is interesting as showing the way in which this very early race of man may have employed pictures as a means of communication. We may speak of this stage of human progress, where word of mouth and pictures are employed, as the *stage of oral and pictorial tradition.*

It is a well-known law of organic development that an animal in the early phases of its life-history passes through stages in which it resembles its remote ancestors. The same is true in human progress. And perhaps we may, without extravagance, regard the Kindergarten phase of modern education as a rehabilitation of the stage of oral and pictorial tradition, and may see, in the concerted exercises and musical drill, the civilized survivals of what was probably of great value to the tribe in early time, and is still of great value among savage races, surviving among them as the war-dance. The value of such exercises alike among savage tribes and in our civilized Kindergarten lies in the social training it affords in concerted action. And musical drill may illustrate, what is not improbably the fact, that music arose in the history of our race as a rhythmic accompaniment to the rhythm of the dance.

Note that the word "tradition" employed for this

stage of communication serves to emphasize the fact that the accumulated knowledge of one generation is thus handed down or carried on to the next. This is one of the most distinctive features of descriptive communication as compared with that which we have termed indicative. In the indicative stage of the use of words there is no tradition or handing on of the results of experience. What is indicated is essentially present experience. It deals wholly with the here and the now. A child in this stage, for whom words have only an indicative value, is incapable of understanding the relations of past and future. If we say, "I will take you up presently," or, "I took you up just now," it is the word "up" that has indicative force, unqualified by the past or future relations we have introduced in our description; and he repeats the word "up" to indicate his present need. Not until relations are perceived, and the apprehension of such description is rendered possible, does the child begin to take the past, as past, into his view, or extend his mental vision so as to include the future. Of course, in remembrance he has representations of past events; but such memories are present to his consciousness at the time of remembrance, and that relation to the present in which lies their perceived pastness is not yet an object of perception. It is characteristic of sense-experience, prior to the development of perception, that it lives wholly in and for the present.

When from the stage of oral and pictorial tradition we pass to that of *written record*, we make a great onward stride. The child is taught to read and write. He is thus provided with the means of

apprehending and comprehending all the knowledge placed upon record by those who use that language which he has been taught to read. Reading and writing are of course a valuable means of intercommunication, more extended both in space and time than is possible by word of mouth alone. But this is not their chief value. Their chief value lies in the fact that written language is a record of thought and experience, while the ability to read this written record places us in touch with all the thought and experience thus recorded. And since this is so, since the essence of thought can thus be dissolved in the medium of language, and so handed on, that he who can read may thus drink the accumulated knowledge of the past, it might be supposed, and is supposed by some, that all we have to do is to drink deep of books, and thus absorb the wisdom of the ages. But a right understanding of the relation of language to thought will enable us to grasp how fallacious this is. Language is the expression of thought; but it is the symbolic expression. Its symbolism is rendered suggestive through association. Or, since the word "symbolic" may itself be misleading, let us say that words are the signs of ideas, and that their significance is learned through association. There is, for example, a general idea concerning vibrations which is expressed, symbolized, or signified by the word "amplitude." To those who have already formed a conception of amplitude, and who have learnt to associate the conception with this word, the word carries significance. To those whose conception is definite the significance is definite; to those whose conception is hazy the signifi-

cance is also hazy; to those who have no conception the word has no significance. So, too, of language in general. It is significant only to those who have already reached the conceptions it embodies, and have learned to associate the conceptions with their verbal embodiments. Hence the necessity, as already pointed out, of constantly submitting our conceptions to the touchstone of experience, and allowing a continual to and fro play between generalizing conception and particularizing perception.

It may be said, What, then, is the use of describing or explaining that which is new to the experience of the hearer? If language is significant only to those who have already reached the conceptions it embodies, how can we lead up through language to new conceptions? Let us note what steps we practically take in such cases. We wish to describe quicksilver to a child. We say that it is something like this pewter in its brightness and the way it reflects the light; it is even heavier than this lead; it is liquid like water, so that I could pour it from one vessel to another. And we might further qualify each of these statements so as to render them more exact. Now, we may assume that all the words in which the quicksilver is described are significant to the child; if they are not significant the description so far fails. At the end, if he have good powers of synthesis, he may combine these particular properties thus signified into the new idea we wish him to form. The word "quicksilver" then becomes significant to him. But significant of what? *Of a bit of mental synthesis he has performed under our guidance.* The qualities so combined are matters of direct experience,

and the words which express them are *directly significant.* The result of the synthesis (the quicksilver) has not been an object of direct experience ; the word "quicksilver" is only *indirectly significant.* To the questions placed at the beginning of this paragraph, we must reply, that since language is significant only to those who have already reached the ideas it embodies, the new ideas to which we can lead up through language are only indirect or second-hand, and the words which stand for them are only indirectly significant. And the use of describing or explaining that which is new to the experience of the hearer is that, through apprehension and comprehension, he may reach indirect conceptions preparatory to the direct conceptions which will result from direct experience through individual observation, perception, and conception. The distinction here drawn between indirect conception and significance on the one hand, and direct conception and significance on the other hand, is one which the teacher should clearly grasp. Let him by an appeal to his own experience answer the questions, What is the relative validity of direct conception and indirect conception ? Which is the most real and vivid ? Which answers most closely to the facts of existence ? There can be little doubt about the answer. Indirect conception is a makeshift, most valuable as preparatory to direct conception, but of nothing like the same validity and reality. The teacher should therefore lose no opportunity of encouraging dissatisfaction with merely indirect conception, and of helping his pupil to see the importance of making their conceptions direct by bringing them into perceptual touch with experience. So far

as is possible, every word should be rendered directly and not merely indirectly significant. Thus only will the true relation between language and thought be established.

The words "significance" and "meaning" are used for the most part interchangeably—that is to say, they bear much the same meaning or significance. They are somewhat troublesome, however, from the fact that they are applied not only to words, but to ideas and objects of thought. We not only say, for example, that such and such a word or phrase is significant and full of meaning, but we say also that this or that observed fact is significant, or that we now see its meaning. Or we may say that such and such an observation, which apparently has no bearing upon any generalization, is insignificant and without obvious meaning. The two uses are, however, closely connected; and a brief consideration of the connection will serve to bring home both the real meaning of significance and the true significance of meaning.

Knowledge—and the same is true of the thought which embraces it—is a closely-related whole, all the parts of which are mutually interdependent. Nothing therein is isolated or independent of the rest. If any observed fact is apparently isolated and independent, we say that we do not see how to fit it into our scheme of knowledge, and that, for the present at least, we are unable to explain it. We may note, in passing, that different people regard these apparently isolated and inexplicable facts or observations from different points of view. Some ignore or neglect them, as tending to interfere with a scheme

of knowledge with which they are well satisfied. Others hail them, and try to make them the starting-points of new investigations. They hold that their scheme of knowledge is, after all, limited and imperfect. They are dissatisfied with its limitations and imperfections, and would gladly extend and perfect it. The one set of people ignore and neglect the apparently isolated observation, because it has for them no meaning or significance; the other set hail it, because they hope to ascertain its significance and meaning. From which we may gather that these words express *the relation which any object of consciousness bears to the general body of inter-related knowledge.*

But language is the medium in and through which knowledge is communicated. It too shares in the close interdependence of knowledge. Isolated facts and observations are not knowledge; nor are isolated words and phrases language. Just as, when we inquire what the meaning of a fact is, we wish to know its relations to other facts and to that part of the body of knowledge which comprises it; so too, when we inquire what the meaning of a word is, we wish to know its relations, as a symbol of thought, to other symbols and to that part of the body of language which comprises it. Hence we can never say what the full significance and meaning of a word is unless we know what its context is in the sentence. Significance and meaning, then, in all cases imply the conception and perception of the relations involved; but as applied to words they imply the conception and perception of a double relationship—the relations of the symbols, and the relations of that

which they symbolize. All through, mental training from the nursery to the study involves a concurrent education in language and thought.

For purposes of exact science, and for purposes of logical treatment, the meaning of certain words is rigidly and accurately defined. They then become what are called *technical terms*. In physics, for example, we must not use the terms "energy," "mass," or "acceleration" in any other than their technical acceptation; in geometry, the terms "point," "circle," "radius," and so on, are carefully defined. The technical language of science thus possesses the advantage of rigid accuracy of significance, but it thereby becomes mechanical and loses its plasticity. In the language of literature, on the other hand, the words employed are not technical terms, rigidly and accurately defined; they acquire their significance to a far greater extent from the context. Their relations to each other may be described as rather organic than mechanical. In the literary product of a great master, while the meaning and significance are scarcely, if at all, less exact than in the language of science, the inter-relations are far subtler. They involve great delicacy and nicety of perception. In our higher education we afford opportunities for the training of mind in the relations of language and thought not only in scientific description and explanation, but also in the more imaginative products of literary masters with their more direct suggestion of emotional tone. And if we have in view all-round mental development, a training neither in the language and thought of science nor in the language and thought of literature should be omitted.

The language and thought of our daily conversation is, as a rule, neither one thing nor the other. It has neither the exactitude of the mechanical relation characteristic of the one, nor the delicacy of the organic relation characteristic of the other. But if often somewhat hazy and indefinite, it is, at any rate, eminently plastic.

By learning to read, the child passes from the stage where he is merely receptive of oral and pictorial communication, to the stage at which he can make use of the written record. But he is then only entering upon the threshold of his education. How shall we train him so that language and thought may develop in him to their best and highest uses? One way of answering this question would be to sketch out a self-consistent scheme of education, primary and secondary, and diverging thence into technical and university. It is not my intention to attempt anything of the sort. I shall content myself with the more modest endeavor to indicate as briefly as possible what would appear to be the chief psychological import of the subjects which are commonly taught.

We may first note that a subject may claim a place in an educational scheme—(1) on account of its direct educational value as a means of mental discipline; (2) on account of its utility, by which is meant not only its utility for getting on in the world, but also its utility for further intellectual progress; and (3) on account of its æsthetic or moral worth.

Little need be said on the value of *grammar, composition, and the analysis of sentences.* But we should not begin to teach grammar too soon; nor

should we make it an exercise in mere memory-work, with rules, lists of examples, and lists of exceptions, all learned by heart. When the child is already tolerably familiar with the use of his own language, and is sufficiently developed to be able to perceive the relations of the words to each other in a sentence, then, *starting with the sentence, not with the grammar book,* we should train his powers of perception of these relations. And an admirable field for the training of perception it is. When these relations have been perceived in a great number of particular cases, we may lead the pupil on to generalize these perceptions, to conceive the relationships, and to apply the conceptions in particular cases. In this way parsing and the grammatical analysis of sentences may be made a real and very valuable mental discipline. The child should not be allowed to see a grammar until his powers of grammatical perception are such that he is beginning to have complete confidence in them, nor until he has reached, under due guidance from the teacher, a number of generalizations for himself. Then he may use a grammar, but even then chiefly as a book of reference. Composition may be used as a means of exemplifying what has been learned in the study of grammatical analysis. But just as the child should be encouraged to see that language is not only a medium for the perception of grammatical relations, but a medium through which emotional tone may be evoked; so, too, he must be encouraged to use language in composition to a similar end. He should be encouraged to develop that appreciation of literary form which characterizes the best use of language, and to ex-

press himself in a form that is at any rate not awkward, slipshod, or incorrect.

I pass now to the study of *foreign languages*. For direct educational value there is no question that such a highly inflectional language as Latin stands far higher than modern languages. Indeed, we may say that the comparative study of an analytic language like English, and an inflectional language like Latin, is essential for the best training in the perception of grammatical relations. In the inflectional language each word bears on its face the sign of its relationship. "Magister pueros docet." The subject is here clearly indicated and marked off by its termination from the object as complement of the predicate. The time-relation is also clearly shown in the form of the verb. In English, though we still retain some inflections, we as a rule indicate the relations either by separate words or by position in the sentence. While in Latin we say "docet," "docuit," "docebat," or "docebit," the verb itself showing the time-relation, in English we say "teaches" and "taught," so far like the Latin, but "was teaching" and "will teach," here using separate words to express the time-relation. In Latin, as in English, the grammatical analysis should, so far as is possible, be made a matter of direct perception in the sentence, not a matter of rules learned by heart in the grammar. The headmaster of a grammar school tried, for a term, the experiment of giving no grammar work from the book, but taught his form to exercise their perceptions on the grammatical relations as they naturally arose, and to generalize the results they obtained. At the end of the term he set a grammar

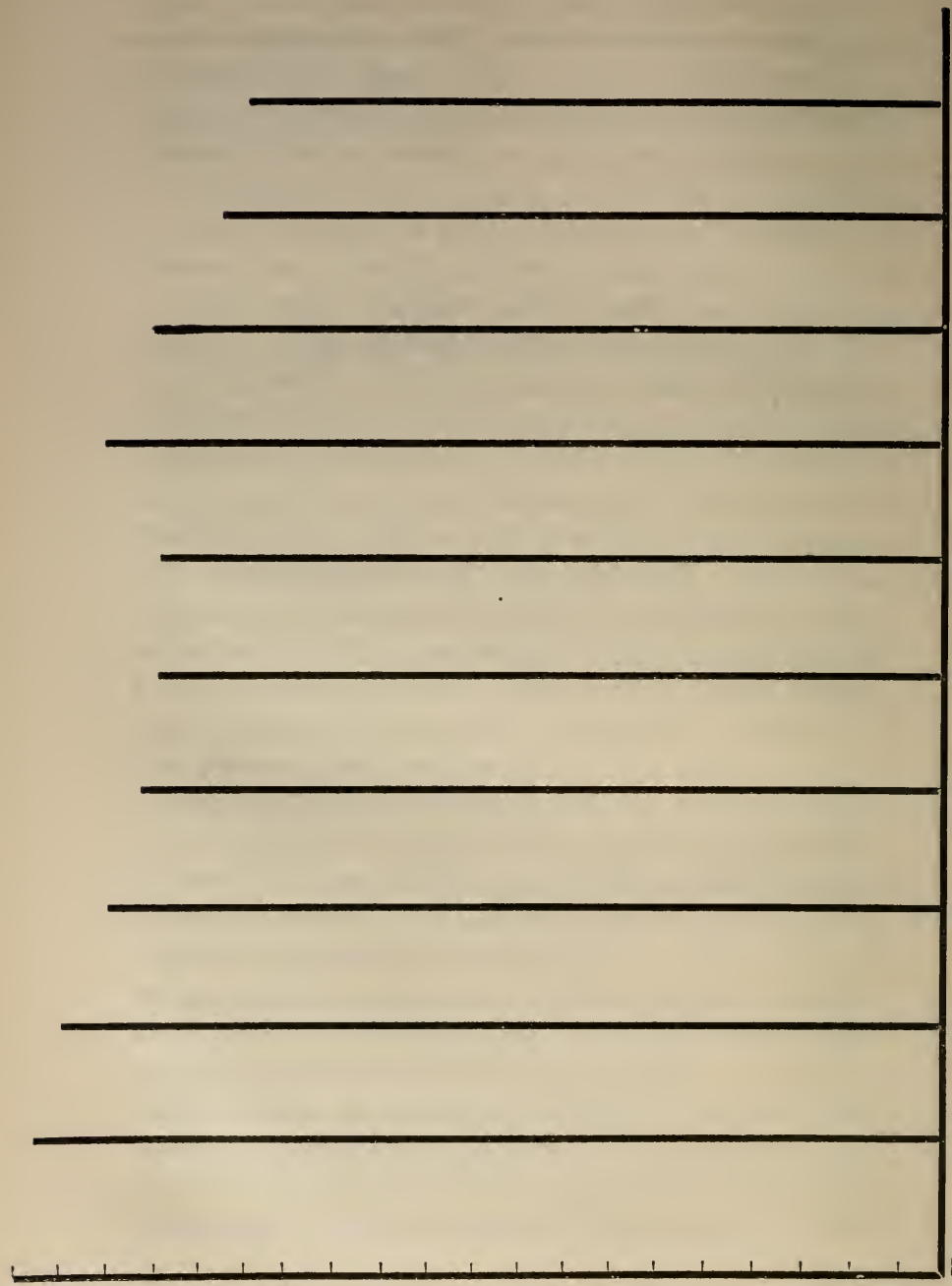
paper ; and though the form was nowise above the average, the grammar papers they sent in were distinctly above the average. It is as a means of training the faculties of perception and generalization that the study of such a language as Latin in comparison with English is so valuable. For utility, French and German are superior to Latin. For this purpose a conversational and reading acquaintance with the language is of more service than a training of grammatical perception by its means. Indeed, the relations to be perceived are so similar to those already provided for in the study of English and Latin, that in the study of French or German reference to them should only be incidental. The teaching of a modern language should be, and generally is, on different lines from those marked out for the study of Latin. All these linguistic studies offer a convenient field for the encouragement of the "how" attitude and the "why" attitude. And it is partly because the "how" and the "why" admit of such ready descriptive and explanatory answers that such studies are of such value in mental discipline. Etymology may be made a means of training in the comparative method, and may serve to introduce conceptions of development. By this means, also, information of social value and import may be introduced, and the mental horizon widened. All of these foreign languages, Latin, French, and German, open up great and wide literatures, though few there be that find them. Here, however, Greek takes precedence of any. For the encouragement and stimulation of an appreciation of literary form at its very best, Greek stands unrivalled. But of those

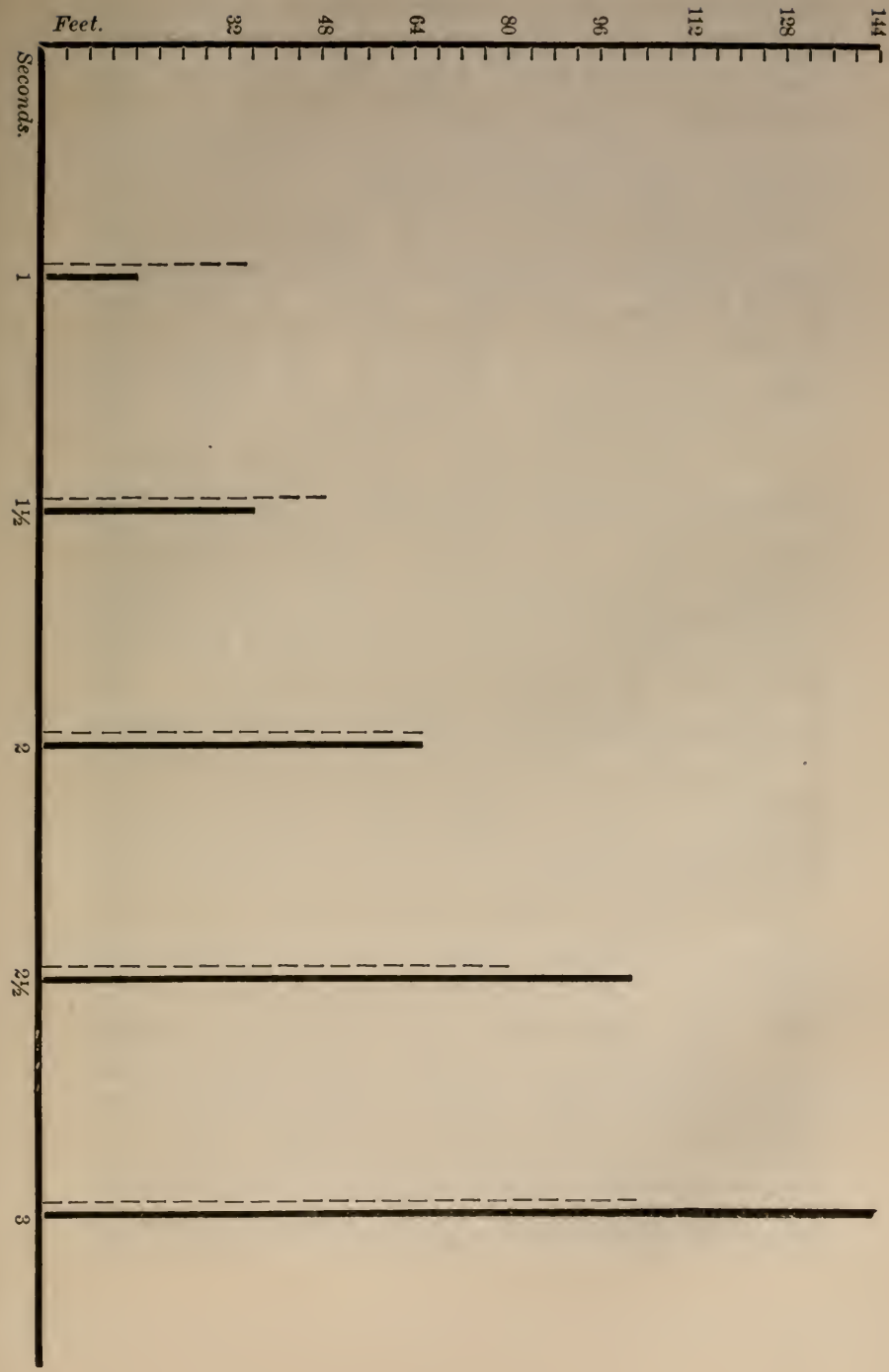
who learn Greek at school, how few reach anything like a full appreciation of the literary wealth thus placed within their reach, and how few find time to keep up their acquaintance with the language. Greek is taking its position as a language the adequate study of which is not for the many but for the few.

Concerning *mathematics*, the branch of study that deals with numerical and quantitative relations, little need be said. Its great value, both from the point of view of mental training and discipline, and from that of utility, both commercial and intellectual, is admitted by all. It is typically exact, and fosters accuracy of thought; and this thought is expressible by means of a special language or notation of corresponding exactness. It affords admirable illustration of abstraction and generalization in close combination; but its generalizations admit of being readily particularized in examples. The teacher should, so soon as the mental powers of his pupils are ripe for it, illustrate by means of mathematics the nature of abstract and general ideas; and the relation of these ideas, as abstract and general, to the particular cases in which they are exemplified. It is a subject, however, which in its higher ranges makes great demands on the memory; but at the same time trains the faculty of systematic recollection. It emphasizes the logical relationship, and is of immense value in aiding the pupil to conceive and perceive the "therefore." An exercise of some value for those who are sufficiently advanced is to translate examples of geometrical reasoning, such as propositions of Euclid, into logical form. Or this may be brought out less formally by a continual asking of the question "Why?" and no

subject lends itself better to the training of the "why" attitude than mathematics. The mathematical train of reasoning is apt to get a long way from the fundamental generalization, and a series of "whys" are necessary to bring us down to these foundations.

Geometry is of especial value in bringing home to the eye in perception certain abstract and general numerical and quantitative relations; those who excel in applied mathematics having often a special aptitude in translating the problems with which they have to deal into geometrical form. It is often exceedingly helpful to bring home to the eye, by means of visible space-relations that can be readily perceived, quantitative relations which could not be directly perceived. For example, the fluctuations in the value of the rupee between 1884 and 1893 are brought home to the eye in the figure on p. 178; while in the figure on p. 179, the space, in feet, passed over by a body falling under the uniformly accelerating force of gravitation, at the end of the first, second, and third seconds and the intervening half-seconds, is shown by firm lines; the velocity acquired at the end of each second and half-second is shown by broken lines. This *method of diagrammatic representation* is often a great aid to the apprehension of description dealing with quantitative relations, and to the comprehension of an explanation of the facts described. The teacher should make himself familar with its use. Two lines are drawn at right angles. The vertical line is used as a scale for the quantitative relations to be perceived. In the diagram on p. 178 it is a scale of value, marked off in pence and


1s. 8d.
1s. 7d.
1s. 6d.
1s. 5d.
1s. 4d.
1s. 3d.
1s. 0d.
0s. 9d.
0s. 6d.
0s. 3d.
Value.
Year
1884
1885
1886
1887
1888
1889
1890
1891
1892
1893


Feet.
32
48
64
80
96
112
128
144
Seconds.
1
1½
2
2½
3

shillings, each division representing one penny. In the diagram on p. 179 it is a scale of feet, each division representing four feet. Along the horizontal line are arranged the facts described. If, as is often the case, they are described as occurring at definite time-intervals, these intervals should be placed to scale along the line. On p. 178 the intervals are years. On p. 179 they are half-seconds. Perpendiculars are drawn to scale over the position of each fact described. Thus, over 1884, on p. 178, the average value of the rupee in that year, one shilling and sevenpence halfpenny, is represented to scale; and over 1893, the value in that year, one and twopence halfpenny, is similarly represented. Thus, too, over one second on p. 179, 16 feet, the space passed over in one second, and 32 feet, the velocity at the end of that second, are represented to scale; and over three seconds, 144 feet, the space passed over in that time, and 96 feet, the velocity acquired at the end of that second, are similarly represented. If in this diagram the upper ends of the broken lines be joined by a straight line, and the upper ends of the firm lines be joined by a curve, the uniformity of increase in both cases is brought home to the eye, the increase in the velocities being in arithmetical progression, while the increase in the spaces passed over is in geometrical progression. And thus the generalizations, $v = 32t$ and $s = 16t^2$, may be led up to. It will be noticed in the diagram on p. 178, that while the value of the rupee fell from 1884 to 1888 and 1889, it rose in 1890. This should at once suggest the question, Why? It was, we are told, a temporary rise, of brief duration, due to the action of the United States Government

in buying up silver with the object of maintaining the level of its value as compared with gold. And it is one of the generalizations of political economy that increased demand is accompanied by a rise in price. Enough has now been said to enable the teacher to understand the method of diagrammatic representation, or the *graphic method*, as it is often termed.

Incidental reference has already frequently been made to the use of *science* in mental training. In the early stages of education it should be purely observational or experimental and descriptive; and it must throughout be thoroughly practical. For observation by itself, elementary botany; for observation with experiment, elementary physics and chemistry are best. Our aim is to make the pupil perceive for himself natural relationships. Later on simple generalization will follow. But the uttermost care on the part of the teacher is needed to avoid, on the one hand, introducing explanations beyond the powers of his pupils, and, on the other hand, letting the so-called science degenerate into mere rule-of-thumb work. Invaluable as a real training in elementary science is in education, we have to be constantly on our guard lest it sink to the level of mere memory work, dealing with a number of terms and phrases which have only what we call indirect significance, supplemented by some testing of solutions to give an appearance of practical value.

The direct educational value of *history* is to widen the mental horizon. It should, in the early stages of education, be picturesque and anecdotal. It should carry with it a considerable body of emotional tone; and it should be charged, not obtrusively, of course,

but quite insensibly, with moral purpose; for its value to a great extent lies in its social influence. One of the chief difficulties in teaching children history is to afford anything like a realizing idea of time-relations, and of what we may call time-proportion. This involves what is called *localization in time*. The child should first be taught to localize events in his own experience. I would suggest to the teacher of young children to try the following plan. Get, or make, a long strip of paper. Tell your pupils that you are going to keep a record, day by day, of the events of the week. Write down these events, the lessons learned, the games played, the walks taken, anything that interests them, from below upwards, beginning at the bottom of the strip, and marking the day—morning, afternoon, and evening. At the end of the week, tell them that you are going to show them the record. Hang the strip over the back of a chair, bidding them stand in front, and then pull the paper slowly over so that the record of event after event comes in due order of succession into view. They will—so I am told by teachers who have tried the plan—be delighted at seeing the record of the week's events pass before them in a few minutes. They will thus get an idea of a condensed time-record—the week's events being condensed into five minutes. They will soon be able to localize the events in the week—such localization being a perception of the time-relation of the event in question to other events. A similar record-scroll may be made to represent the chief events of their life, And thus we may lead up to historical record-scrolls; and our pupils may be taught to localize events in historical

time. The days of the week in our first scroll represent the dates in our historical scroll. But it must be remembered that dates are symbolic of time localization, and until the child can localize in time are meaningless. No doubt, at a somewhat later stage, the dates of the salient events of history should be committed to memory as reference points for time-localization; but this should not be permitted until such dates have acquired meaning.

It was noted just now that the study of history had a moral value. This perhaps comes out most clearly when we pass from the descriptive to the explanatory stage, for then we have to consider the motives for conduct and action. History in the explanatory stage is a subject rather for university than for secondary education. The schoolboy, and this is true also to a large extent of the undergraduate, has too little experience of the world for the great facts of history to assume for him their true significance; hence it is not till we reach mature years that the real bearing and full value of historical study begins to appear.

Under the heading of *geography* we teach localization in space by means of maps, which condense within the reach of visual perception space-relations too wide to be embraced by the eye. As localization in time should be taught to little children by the aid of events which fall within their individual experience, so should localization in space be taught by the aid of areas of which the child has such experience. When a child can understand a map of the garden or playground, and of his own village, or a part of the town in which he lives, he is prepared to understand a map of the county or kingdom. But the geographical

conceptions of a stay-at-home child are probably very vague. Under the head of geography is also conveyed a more or less miscellaneous mass of general information concerning other lands from the historical, political, commercial, or social point of view. This has very little value as mental discipline ; its value, like that of history, lies mainly in the fact that it widens the mental horizon and is of social import. Under the head of physical geography we describe and explain the manner in which the physical features of the earth have been produced. It is of little value (except as information) unless associated with previous or concurrent training in elementary science.

It is hardly necessary to add that education is incomplete unless there is a training in *skill* both in the use of the delicate finger muscles and in that of the larger and coarser body muscles.

In all subjects, with the exception of that of skill, it is essential that there should be concurrent training in language and thought ; and that both conceptions and the words by which they are expressed should be, as far as possible, directly and not merely indirectly significant.

CHAPTER IX

LITERATURE

It has already been shown that mental development is an individual matter; that the mind of a child, like his body, grows in virtue of an innate and inherent synthetic tendency; and that all the teacher can profitably hope to do is to supply the most favorable conditions for growth and development. And if this is true of the mind in its cognitive aspect, it is equally, and perhaps more obviously, true of emotional development. We will take literature as our example of the wide field of artistic culture. And here we feel to the full our helplessness to do more than minister to nature. If there be no inborn faculty of appreciation for literature, we cannot hope to implant it by any method of instruction; and if such faculty be given, all that we can do is to afford the material and the opportunities for its ripening and maturing.

There would seem to be some people who, in adult life, have little or no appreciation of literature. They see, for example, nothing particular to admire in Tennyson's beautiful lines—

> "And Morn
> Has lifted the dark eyelash of the Night
> From off the rosy cheek of waking Day;"

or in such lines as those of Lowell's—

"The rich buttercup
Its tiny polished urn holds up,
Filled with ripe summer to the edge."

And if they do not feel the beauty of such passages, what can we do? It will certainly be of little avail to try to describe and explain—even if it admitted of explanation—wherein the beauty lies. He who is wise will change the subject. But with children it is our duty to foster their appreciation. And fortunately there are few children in whom there are no germs of appreciation which may be so fostered. In most cases the absence of receptive imagination in grown-up people is due to the fact that in them the germs have never been cultivated, or the young shoots of imaginative appreciation have died down and withered in the sterile soil of their daily life. But the ministry of the teacher is here peculiarly difficult; for what the child is capable of appreciating is often very different from what the teacher himself appreciates. Certain it is, however, that if the teacher have never cultivated his own faculty of appreciation, he will be little able to render efficient service to his pupils in this respect. Hence his aim should be so to establish a mental background of appreciation in himself that he may be able insensibly to influence in a similar manner the minds of those who are committed to his care.

In our elementary education a good deal of stress is rightly laid on recitation. This affords material in and through which appreciation may be trained. But the mere getting by heart of the poetry which is recited is the least important part, in educational value, of recitation. At first, no doubt, the child

must devote all his efforts to learning his piece by rote. But the true criterion of excellence in recitation is not merely that it should be word-perfect, but that it should show that the reciter has entered into the spirit of that which he recites. And he should be early made to understand that correct manner and method are certainly not less important than correct matter. Here demonstration is of far more service than description. The teacher must himself be able so to recite or read as to show how the spirit of the piece may be brought out. At first the manner and method of the child will have little individuality; they are based, through imitation, on the manner and method of the teacher. But it is surprising how soon the individuality of the child makes itself felt; and such individuality should be encouraged so long as it does not run into mannerism. As the pupil thus becomes independent of the teacher, he is able more and more clearly to show the extent to which he appreciates that which he recites.

To the recitation of poetry should be added practice in reading aloud, not only poetry of varied metre, but good literary prose. Thus fresh material will be supplied on which the developing faculty of appreciation may be exercised. The usual plan in English secondary and public schools is to drop all recitation and reading of the literature of his own language just at the time when the boy's appreciation is so far developed as to enable him to enter into the spirit of the work of the best masters. It is true that a play of Shakespeare or one of the "Idylls of the King" or other set piece is prepared with the aid of copious notes; and an examination is set which deals

with text and notes. But from the nature of the case the examination paper deals with them *entirely in their cognitive aspect.* Look through such a paper and what do you find ? A series of questions set, apparently, with the object of ascertaining how much general information concerning the subject matter of the piece, or suggested thereby, the boy remembers. All this is, no doubt, useful. But it is no test of literary appreciation—a matter which no examination paper can adequately gauge, and hence a matter too apt nowadays to be neglected.

It forms, however, no part of my present purpose either to criticise existing methods of education or to suggest practical reforms. I can but indicate what appears to me necessary for the training of faculty. The problem is : Given a faculty of appreciation, which answers on the part of the recipient to the creative faculty on the part of the literary artist, how are we to train it ? By all means let us render assistance in the apprehension and comprehension of that which our author has written. In this we cannot be too thorough. But, after all, it is not herein that appreciation lies. Nor can we expect a boy to describe his appreciation ; as well ask him to describe his appreciation of a fully ripe peach. But we may expect him to give expression to that appreciation through the reading of selected passages from his author. And we may and should teach him so to use his faculty of speech as to reflect the beauty of the literature he appreciates. Thus only can he show us how far his receptive imagination answers to the creative imagination of the author he interprets.

The term "*imagination,*" like so many others in

psychology, is used in different senses by different writers. It is well to use it to denote *the synthetic faculty by which ideas are recombined to form new products.* The phrase "passive imagination" is sometimes used for the unconscious and unintentional recombination of ideas; while "active imagination" is used for their conscious and intentional recombination. The distinction is, however, hard to preserve. It is characteristic of genius that the riches of imagination seem to pour forth unbidden and without conscious effort. Nor can the mind under such circumstances be well called passive. We may distinguish between three uses of the imagination. In *scientific imagination* the recombination of ideas is for purposes of explanation; the end in view being intellectual, and the attainment of knowledge. In *inventive imagination* the recombination of ideas is for purposes of mechanical construction; the end in view being practical, and the aim, utility. In *artistic imagination* the recombinaton of ideas is for purposes of art; the end in view being æsthetic, and the aim, beauty. A further distinction—one that applies to all these uses—is that between the *creative imagination* of the man of science, the inventor, or the artist, and the *receptive imagination* through which we respond to his creative synthesis. The appreciation of which we have been speaking involves receptive imagination. The creative imagination of the poet is quite lost upon the reader or hearer who has no kindred receptivity. Hence the appreciation of imaginative literature presupposes a faculty which shall go out to meet and embrace the creative product of the artist. People of little imagination regard the similes and

metaphors of the poet as far-fetched and extravagant. Why should Tennyson speak of the "dark eyelash" of the night, or the "rosy cheek" of morn? What could have induced Lowell to call the flower of a buttercup an "urn," and to say that it was filled with "ripe summer"? For the lack of imagination in many of us—especially men—education rather than nature is answerable. Children generally revel in fairy tales and delightfuly improbable stories of adventure. But there are some parents and teachers who check all such reading; it is not practical, and will be of no service in this busy, workaday world. Moreover, during school-life the boy has generally very little spare time for the reading of imaginative literature. The curriculum is so arranged that, when the daily routine of work and games has been duly fulfilled, there are but few odd moments left to devote to the novel or the drama. Even the holidays have their set task of some book on which the inevitable examination, optional or compulsory, is held. No doubt there are good reasons for this course. No doubt, if much spare time were left, but few boys would devote it to good literature; and these few may be trusted to make or steal the time if they have a real bent for literature. But the fact remains that the many do not cultivate their imaginative faculty.

There is one further fact concerning imagination in literature which may be noted, since it illustrates in a new way what was said concerning the relation of the general to the particular, and of conception to perception. In literature, as in art-product, generalization takes the form of *idealism*; particularization,

that of *realism*. The ideal in art involves abstraction and generalization—abstraction in the omission of all details which are not necessary to the idealized product; generalization of the essential features reached by abstraction. Realism, on the other hand, involves the introduction of such details as shall assimilate the representation to actual fact, and the incorporation of the results of generalization in individual persons or concrete things. Utter realism would be the exact portrayal of life and nature as it is, with no trivial detail omitted. In the first place, this is not possible; in the second place, it is not art. What is meant by realism in art or literature is therefore the introduction of so much detail as shall make the ideal representation *lifelike* and *natural*. What the artist, literary or other, aims at is the due balance between idealism and realism. The ideal conception of the creative imagination has to be embodied in particular form; and Hamlet, Monkbarns, or Tito stand before us.

The subject matter of literature is as varied as are human interests. In it are reflected all the aspects of external nature that appeal to us as human beings, all the phases of human life and endeavor, and all the yearnings and passions of the human soul. All that we see and know, all that we hope and believe, all that we fancy and imagine, are reflected in literature. It is quite impossible, therefore, to define literature as a whole by its subject matter. Nor is this subject matter in any way definitely marked off from that of science. Neither literature nor science can claim a monopoly of any group of natural phenomena. Man and nature afford subject matter to

both. And our own century has witnessed science, on the one hand, endeavoring with increasing success to justify the application of its canons to the study of man, and literature, on the other hand, turning with increasing sympathy for inspiration to the realm of nature. It is not in their subject matter broadly considered that literature and science differ, it is in their attitude and spirit and purpose.

Now, since different men and women have different interests, and derive their pleasure from different sources, there are many kinds of literature. Nor is there one kind of literary excellence, but many. This is implied by the adjectives we use: sublime, majestic, grand; tender and pathetic; exciting, thrilling; humorous, witty, comic; and so forth. We do not, or should not, apply the epithets "beautiful" and "pretty" to the same piece. And this implies a variety in our appreciation. The same kind of literature does not appeal in like degree to all of us, nor indeed in the same way to any one of us in his different moods. These facts must be steadily borne in mind by the teacher. He must remember that what appeals strongly to him at his stage of mental development may not appeal at all to his pupil, who is at an earlier stage. If he attempts in any way to force upon an immature mind an appreciation unsuitable to its stage of development, he may either prejudice the pupil for life against that type of literature, or encourage a sham appreciation, than which nothing is unfortunately more common or more silly. What he has to do is to educate the appreciation, leading it on step

by step in its upward development. He must remember, too, that his aim is to minister to all-round mental development. He should endeavor to cultivate an appreciation of literary excellence in all its phases. The majestic verse of Milton and of Wordsworth at his best; the polished excellence of Tennyson, and the concentration and dramatic power of Browning; the broad humanity of Shakespeare and of Scott; the humor and pathos which find such different expression in Thackeray and Dickens; the strength of George Eliot and the delicacy of Elizabeth Browning; the word-painting of Ruskin and Carlyle, the wit of Tom Hood, and the delicate humor of Charles Lamb,—all these should have their chance of appealing to a mind that has had an all-round education in appreciation. And since we must distinguish between our lower and our higher interests; between the pleasures which are mean, trivial, or sordid, and those which are ennobling, and appeal to what we feel to be the better side of our nature; so we should encourage our pupils to appreciate best that literature which appeals to lasting and enduring interests, to those pleasures which are ours in virtue of our distinctive humanity.

Literary form appeals primarily to the *ear*, and we should endeavor to cultivate a due sense and appreciation of the melody of literature. Even when we read to ourselves, the element of sound is not absent, but accompanies re-presentatively that which is presentatively given to the eye. In early days before the invention of printing, the appeal of the poet was mainly to the ears of an audience; now it is more largely to a circle of readers. And since the eye

can take in a more complex and longer sentence than the ear—since, too, the reader in his study can pause and go over a passage again if he have not caught its rhythm or its meaning—some modern poetry has become too complicated and involved for the ear to follow. Few, for example, could grasp on first hearing, or indeed on first reading, the following passage from "Sordello"—

> "While
> Crowd upon crowd rose on Sordello thus—
> (Crowds no way interfering to discuss,
> Much less dispute, life's joys with one employed
> In envying them,—or, if they ought enjoyed,
> Where lingered something indefinable
> In every look and tone, the mirth as well
> As woe, that fixed at once his estimate
> Of the result, their good or bad estate)—
> Or memories returned with new effect."

Judged by the appeal to the ear, such a passage stands condemned. And, at any rate for the purposes of education, the appeal to the ear is the surest criterion of excellence in literary form. To the appeal to the ear, however, an appeal to the voice should be added. Hence the great and, in secondary education, too little recognized importance of reading aloud. I revert to this because it is, in my judgment, of great value in the training of the faculty of appreciation, while it is also a delightful accomplishment. How few Englishmen of average education are capable of reading effectively a passage in prose or verse so as to bring out its rhythm and melody, its delicacy or its force. And though a man's powers of elocution are not necessarily an index of his faculty of appreciation, yet this is the most expressive means

at his command for showing his appreciation. If, too, there is any truth in what has before been urged, that language and thought develop hand in hand, we may fairly expect that appreciation and its expression should so act and react upon each other as to facilitate the concurrent development of both.

We cannot here consider at any length how the child should be trained to use aright his gift of speech for purposes of reading and recitation. As before noted, demonstration is here of far more value than description. The child must be shown—not told—how to read well. The articulation must be clear and distinct, free from provincialism and mannerism. Rate of utterance and emphasis must be duly graded. And the melody of intonation must subtly indicate a sense of harmony between the thought and its expression. Sing-song in repetition or reading must be checked at all hazards. Unfortunately, much of the simple poetry for children lends itself all too readily to sing-song. Hence the pupil should be taught to read prose with due intonation. It is easier to read well good blank verse than the rhymed couplet. The pupil should also be taught to distinguish clearly between the rhythm and melody of poetry and that of prose, and should be led to feel that the difference lies a good deal deeper than the way in which the lines are written or printed. A prose author may consciously or unconsciously fall into the rhythm of poetry—a fault from which even Dickens is not free. Mr. Blackmore, for example, in *Lorna Doone*, writes: "All that in my presence dwelt, all that in my heart was felt, was the maiden moving gently, and afraid to look at me." This is

not true prose melody, but the rhythm of verse. On the other hand, uniformity in the length of the lines does not constitute poetry, though some definite schematic sequence is almost, if not quite, essential. The American poet Walt Whitman shook himself almost entirely free of all the trammels of metre. Both in thought and expression, much that he wrote has great beauty, but it is difficult to read aloud effectively. I may perhaps be allowed to quote one short piece—

"Had I the choice to tally greatest bards,
To limn their portraits, stately, beautiful, and emulate at will
Homer with all his wars and warriors, Hector, Achilles, Ajax,
Or Shakespeare's woe-estranged Hamlet, Lear, Othello—
Tennyson's fair ladies—
Metre or wit the best, or choice conceit to wield in perfect rhyme, delight of singers;
These, these, O sea, all these I'd gladly barter,
Would you the undulation of one wave, its trick to me transfer,
Or breathe one breath of yours upon my verse
And leave its odor there."

Here, where he is most effective, in the last four lines, he departs least widely from the traditional poetic form.

The pupil should always be allowed to read over carefully to himself any passage he is expected to read aloud effectively. It is quite impossible for him fully to perceive the harmony between expression and thought as he reads. Take, for example, the following five lines from a well-known sonnet of Words-

worth's, which are admirable in their delicate harmony—

> "It is a beauteous evening, calm and free;
> The holy time is quiet as a Nun
> Breathless with adoration; the broad sun
> Is sinking down in its tranquillity;
> The gentleness of heaven broods o'er the sea."

It is not likely that the words "breathless with adoration," or the last line with its lingering emphasis on the word "broods," will be rendered with due effect if the reader has no previous acquaintance with the poem. Nor can he catch the spirit of this introduction if he has no foreknowledge of the sequel. Reading at sight is indeed a most useful accomplishment, which should be separately trained. It involves in marked degree that divided attention which was alluded to in the second chapter; for the comprehension of the meaning as we read at sight is some way ahead of the vocal expression. But this very division of the attention prevents the expression from attaining anything like its maximum value. It may be useful, therefore, to be able to read a poem or a piece of music at sight; but it should be understood that this is no fair criterion either of appreciation or of powers of expression. What should we say of an artist who came forward to read or sing in public, and who gave us a mere at-sight rendering? But no artist worthy the name would willingly consent to do such gross injustice both to himself and to his audience.

Let us now pass on to consider what is the psychological nature of that *appreciation* to which reference

has so frequently been made. In the first place, we may note that it belongs to the category of that emotional tone to which we directed our attention in the chapter of Mental Development. It is not primarily a matter of cognition, though cognitional elements may be present. Hence it is exceedingly difficult to define or describe, since both definition and description are in terms of cognition. Appreciation is, however, an example of a special kind of emotional tone—that which is termed *æsthetic tone.* What are the distinguishing characteristics of æsthetic tone is a point on which psychologists are by no means agreed. That which is here said must therefore be regarded as a matter of individual opinion. In common with emotional tone in general, it is in large degree subconscious and concerns the mental background. Or perhaps it would be better to say that it concerns the state of consciousness as a whole, both focus and margin, and especially the relations involved. Herein, indeed, lies, in my opinion, the distinguishing feature of æsthetic tone, as such. *It is the emotional tone associated with those elements in consciousness which we term relations.* It does not, therefore, take its origin until perception has introduced into the field of consciousness these relational elements. Until we can perceive the relations involved in the melody and harmony of literature, the æsthetic tone of appreciation has no place in our consciousness.

We speak in daily conversation of perceiving the beauty of a poetical passage. We say we perceive the beauty, for example, of Browning's description of the awakening of the water from its frosty sleep, when—

"Early in autumn, at the first winter-warning,
The stag had to break with his foot, of a morning,
A drinking-hole out of the fresh tender ice,
That covered the pond, till the sun in a trice,
Loosening it, let out a ripple of gold,
And another and another, and faster and faster,
Till dimpling to blindness, the wide water rolled."

Such perception of the beauty of a passage may mean the perception of the relation of the passage to our standard of beauty; in which case it is a *judgment* and cognitive in its nature. Or it may, and generally does, mean a feeling of appreciation; in which case it is the direct experience of æsthetic tone. What we perceive, in the latter case, is the series of relations involved in the poet's description, and this is so far cognitive. But this perception is accompanied by emotional tone, and herein lies the sense of appreciation of such. We perceive, too, the harmony between thought and expression, and the melodious relations of the words to each other in the rhythm; and this again is so far cognitive. But these perceptions too are accompanied by emotional tone giving rise to our sense of appreciation. It should be particularly noticed that the æsthetic tone, as such, is quite distinct from any intellectual and cognitive process, though it is the emotional accompaniment of that process; just as the pleasure we derive from eating a good dinner is quite distinct from, though it accompanies, the nutritive value of the operation.

The relation of that which is in the focus of consciousness to the mental background in which it is set forms an important factor in æsthetic tone. This is seen in the employment of that which is known as

suspense. Here a series of minor relationships are presented so as to prepare a background in which the emphatic relation shall be set. An example from Macaulay's Reform Bill speech may be taken in illustration: "If, sir, I wished to make such a foreigner clearly understand what I consider as the great defect of our system, I would conduct him through that immense city which lies to the north of Great Russell Street and Oxford Street—a city superior in size and in population to the capitals of many mighty kingdoms; and probably superior in opulence, intelligence, and general respectability to any city in the world. I would conduct him through that interminable succession of streets and squares, all consisting of well-built and well-furnished houses. I would make him observe the brilliancy of the shops, and the crowd of well-appointed equipages. I would show him that magnificent circle of palaces which surrounds the Regent's Park. I would tell him that the rental of this district was far greater than that of the whole kingdom of Scotland at the time of the Union. And then I would tell him that this was an unrepresented district." Note how the background of consciousness is here prepared for the final emphatic statement. And note, in passing, how skilfully the author particularizes and brings the picture home to the eye through his description.

Nor is it only in the employment of the figure of suspense that the influence of the mental background makes itself felt. We all know how some particular line of a poem, or speech in a play, or scene in a novel, fails to carry its due force if torn from its context. Its full weight and beauty is appreciated only

when the mental background has been prepared by what has gone before. How much even Portia's splendid outburst, beginning

"The quality of mercy is not strained,"

loses, if Shylock's question, "On what compulsion?" be not borne in mind. Or, to give but one further example, how tame and trite, taken by itself, is the line,

"And never lifted up a single stone!"

And yet, as the line stands in Wordsworth's idyll *Michael*, it is, at any rate to my appreciation, one of the most profoundly touching and pathetic lines in the whole range of our literature. Few who have entered into the spirit of the poem could read it aloud without a break in their voice.

We have all probably felt the thinness, so to speak, of the earlier chapters of a novel, especially on first reading. There is as yet no mental background which in any way bears upon the facts which are described, and in which those facts can find their appropriate setting. On the other hand, our fullest appreciation of a novel or drama is when we review it in memory. The series of events are seen foreshortened in remembrance; the minor events retire into the dim background; while the salient features of the development stand out clearly in their due relations, the perception of which is accompanied by the æsthetic tone of appreciation. Thus, too, in a sister art, Mozart speaks of "seeing the whole of it" (a piece of music, even a long one) "at a single glance of my mind"; and adds, "The best of all is

the hearing of it all at once." For the purpose of appreciation in restrospect it is important that there should be a single definite development to which minor series of events are subordinate. When there are several co-ordinate series, not duly related, the effect on the mind is confusing. We say that the novel is wanting in artistic unity. *Silas Marner* is an admirable example of such artistic unity; Thackeray's *Virginians* being wanting in this respect.

In saying that a novel is wanting in artistic unity, we are expressing a *judgment*. Such a judgment, it should be noted, though it is exercised in matters of appreciation which are concerned with the emotional aspect of our conscious experience, is in itself intellectual and cognitive. It involves a standard of excellence to which a particular art-product is compared. The standard is often spoken of as an *ideal*; and such an ideal is the product of reflective generalization. It is the net result of all our appreciative experience. The act of judgment is the perception of the relation of the particular art-product, concerning which an opinion is expressed, to our ideal standard. If we say that Tennyson's lines,

> "So all day long the sound of battle roll'd
> Among the mountains by the winter sea,"

are admirable in their harmony of thought and expression, we are asserting that they reach or approach our ideal of excellence.

It may be well very briefly to compare an æsthetic judgment with that expressed in the minor premise of the syllogism. The logical judgment is characterized by its definiteness. For example—

Mammals are warm-blooded ;
A sheep is a mammal ;
Therefore a sheep is warm-blooded.

In the judgment here expressed in the minor premise we assert that the sheep conforms to the standard definition of a mammal ; it is a particular example of a general class. But in æsthetic judgments there is none of this definiteness and logical exactness. The literary ideal is something which is quite real and yet quite undefined. If I say that the following lines of Rudyard Kipling's *Seal Lullaby* are excellent in their kind, I express a literary judgment—

" Where billow meets billow, then soft be thy pillow,
Oh, weary wee flipperling, curl at thy ease !
The storm shall not wake thee, nor shark overtake thee,
Asleep in the arms of the slow-swinging seas ! "

I am not aware, however, of having formulated any generalization of what the peculiar excellence of a seal lullaby should be ; and I certainly am not prepared to throw my conclusion into logical form. And this would seem to be characteristic of æsthetic judgments in general. It is true that we can formulate some few canons of æsthetic criticism. But they do not go far to help us. And if some one asks me, " Why do you regard these lines of Rudyard Kipling's as excellent in their kind ? " I can say but little in reply. And I shall feel that this little is altogether inadequate. It is quite possible, moreover, that my own individual ideal may not coincide with what may be termed the *social ideal*—using this term for the ideal of those among us who from their re-

fined and highly trained faculty of appreciation are best fitted to give an opinion in questions of literature. And this fact—that there is no absolute uniformity of ideal—serves further to illustrate the distinction between literary and logical judgments.

This distinction may be further illustrated by drawing a comparison between literature and science. The primary aim and object of science is to explain phenomena ; its excellencies are accuracy, organization, and rigid logical sequence. It might be described as a concatenation of "therefores." On the other hand, the aim and object of literature is to evoke emotional tone, to appeal to our sense of the beautiful, the grand, the tender, the pathetic, the humorous. Its excellencies are melody, harmony, artistic unity, beauty of thought and expression. It is not a concatenation of "therefores," but a sequence insensibly enchained by a delicate suggestiveness. It depends not so much on logic, though logic may be insensibly present, as on insight. The one is primarily cognitive and intellectual ; the other concerns the emotional aspect of states of consciousness. But by this it is not meant that science is intellectual and literature merely emotional. The best literature is often splendidly intellectual ; the loftier scientific truths stir some of us with a profound emotion. The point is, that the primary aim of the man of science is intellectual and cognitive ; while the primary aim of the man of letters is æsthetic and emotional in the pyschological sense of the term. The one interprets nature under the forms of the intellect ; the other interprets nature under the forms of æsthetic tone. The one strives to make his atmosphere per-

fectly clear and transparent; the other chooses the veiled tints of sunrise and sunset, the reflected lights of the clouds, or the half-revealing, half-concealing radiance of night. Not that the poet's atmosphere is of necessity misty or vague, it may be so transparent that every minutest detail of his landscape is clearly visible. What could be more pellucid than the atmosphere of this little picture of Coleridge's ?—

> "There is not wind enough to twirl
> The one red leaf, the last of its clan,
> That dances as often dance it can,
> Hanging so light, and hanging so high,
> On the topmost twig that looks up at the sky."

But whereas the man of science has no choice but to work under the conditions of the greatest possible intellectual lucidity, the man of letters is free to choose the conditions which conduce to the highest artistic effect.

It is a mistake, however, to regard science and art as antithetical. The man of science is, or should be, an artist. His art-work is the interpretation of nature in its widest sense under the forms of the intellect; just as the art-works of the man of letters is the interpretation of nature under the forms of æsthetic tone. Man of science and man of letters are both creative artists. It is not science and art that are antithetical; but the art-work of science and the art-work of literature, appealing as they do to different aspects of our mental nature. But if they are antithetical, they are not, or they need not be, antagonistic. No doubt a man may, by exclusive devotion either to literature or to science, starve down the other side of his nature and become

lopsided. It is our aim in education to prevent such lopsidedness. And there is in modern times a danger—a real and very ominous danger—that the growth, not so much of science as of what we may term scientism (which may be defined as science minus the artistic ideal), may conduce to the development of a specific class of lopsided scientists. All who have the interests of true education at heart should be alive to this danger. Technical instruction is of great value; but it cannot afford that all-round training and discipline of the mental powers which is the aim of education.

Although, however, there is no necessary antagonism between literature and science, it is undoubtedly true that, either through nature or nurture, the same individual is seldom man of science and man of letters in equal degree. Nor is it desirable that he should be. But the man of science should at least have some sympathy with literature, and the man of letters some appreciation of the art-work of science. And whether he is primarily scientific or primarily literary depends to a large extent on the nature of the mental background. In man, as a rational being, this background is in large degree relational: in the man of science the aspect of the relations therein is primarily logical; while in the man of letters it is primarily æsthetic. In the one it is illuminated by the cold, clear light of reason; in the other it is suffused with the many-hued tints of emotion. And there is this difference between the method of presentation of his work by the man of science and the man of letters—especially the poet. In an adequate treatise on science it is expected of the author to

supply to a very large extent the background in which his conceptions are set. He has not only to give us his thought, but to exhibit with due diligence and care its relations, and its exact position in the scheme of knowledge. Not to do so is to fail in the art of scientific exposition. With the poet it is different. It is no part of his function to supply the mental background. That you must bring for yourself to the study and enjoyment of his work. And the fuller and richer your background, the more sympathetically will you respond to the poet's appeal. Hence the concentration and condensedness of poetry; hence the fact that it is suggestive rather than expository; and hence the fact that, if we have a poor thin background, Shakespeare, and those who sit nearest to his throne, will appeal to us in vain.

To draw but one more distinction between poetry as the flower of literature, and science as the embodiment of rational explanation, we may note that, since the artist must ever breathe the spirit of his art into the materials with which he works, we find that, for the man of science, all nature is instinct with reason; while for the poet the whole universe "trembles with song." As the poet from whom I borrow this expression—Mr. William Watson—sings it—

"Lo, with the ancient
Roots of man's nature
Twines the eternal
Passion of Song.

"Ever Love fans it,
Ever Life feeds it,
Time cannot age it,
Death cannot slay.

"Deep in the world-heart
Stand its foundations,
Tangled with all things,
Twin-made with all.

"Nay, what is Nature's
Self, but an endless
Strife toward music,
Euphony, rhyme?

"Trees in their blooming,
Tides in their flowing,
Stars in their circling,
Tremble with song.

"God on His throne is
Eldest of poets;
Unto His measures
Moveth the whole."

In conclusion, I would remind the teacher that his ministry in the cultivation of the faculty of literary appreciation is far more indirect than it is in the training of the intellect. His guidance here is far more insensible. So much depends upon what may be termed a literary atmosphere. My own headmaster, in my schoolboy years, never let slip an opportunity of introducing incidental illustrations, in the midst of our ordinary work, from the best authors in prose and verse. And out of school hours nothing would delight him more than for his pupils to afford him opportunities of encouraging us and helping us to a healthy appreciation of good literature. More can be done towards establishing a mental background of appreciation for art-work, whether literary or scientific, by the stimulating influence of one who has a spirit of enthusiasm, than by any amount of

set and formal teaching. And the teacher must never forget this cardinal fact—that observation, accurate and sympathetic, true-eyed and true-hearted, is the mother alike of literature and of science, and that just in so far as we too are observers shall we be able to appreciate the art-work of science and the art-work of literature.

CHAPTER X

CHARACTER AND CONDUCT

WHAT is the aim and object of the ministry of the teacher? The general answer to this question has already been given: To furnish the best possible conditions for all-round development. In somewhat greater detail we may say that the teacher has in view the following aims :—

1. To aid in, that is to say, to afford suitable conditions for, the development of sense-experience, the correlation of sense-data, and the co-ordination of activities; and thus to fit the child to deal practically and efficiently with his natural environment.

2. To aid in the development of the perceptive and rational faculties, and in the correlative powers of apprehension and description, and of comprehension and explanation; and to foster the "how" attitude and the "why" attitude.

3. To fit him to play some special part in the social community, and to perform wisely and well the general duties of citizenship.

4. To foster his faculty of appreciation, and to fit him to get the highest and best pleasure out of life, and to give such pleasure to others.

5. To aid him to reach right conceptions of an

ideal self and an ideal community ; and to foster an effective desire for their practical realization.

6. And in general to aid him to make the best use —best for the community and best for himself—of all his powers.

The foregoing list makes no pretence to be complete or exhaustive. It may, however, be objected that, not only is it incomplete, but it leaves out what many people regard as the central and most important of all the objects of education, since no mention is made of earning a livelihood, or of making money and a position in the world. Although I am fully aware of the importance of this object—although in any enumeration of the motives of human conduct and human endeavor its omission would imply blindness to the facts of our existence—still it does not appear to me necessary to introduce it into a statement of the aims of the teacher. It is sufficient for us "to fit the individual to play some special part in the social community." If the individual so fitted plays that part to the best of his ability, the performance of the work and duty thereby entailed will meet its due reward. Suppose that we are training a man to be a lawyer or an engineer ; our part is to fit him to do his work honestly and well, conscientiously and without scamping. We fit him to play efficiently his special part in the social community. The money he earns and the position he wins are the social recognition of work done and duty fulfilled. Of this aspect of the matter we are neither ignorant nor forgetful ; but it does not primarily concern us.

The word *social* strikes the keynote of this chapter. Much that has been said in previous chapters has

tacit and implied reference to our social state. Now we have to give to this social condition its due prominence. If our whole system of education do not bear fruit in character and conduct, of what avail is it?

Even in the correlation of sense-data and the coordination of activities under the relatively simple conditions of sense-experience the social factor is by no means absent; for the environment in which this experience develops is from the first social in its nature. The activities must be performed in just relation to the like activities of others. Description and explanation have no meaning apart from our social state. The intimate relation of language and thought, to which we devoted the eighth chapter, carries with it a similar implication; while literature, music, painting, sculpture, and the whole field of art are a subtle means of social communication. In our appreciation of the best art we feel that we are rising above our lower and merely individual interests, above those pleasures which are mean and trivial, low and sordid, to those which are pure and ennobling, and which appeal to the higher and more distinctively social side of our nature. It is the function of art to raise us into the region of lasting and enduring interests, and to minister to that appreciation which is ours in virtue of our distinctively human and social state. It deals with

> "Great thoughts, grave thoughts, thoughts lasting to the end."

But when we come to conduct we have something more than appreciation. It does not suffice to ad-

mire, no matter how truly, the beauty of nature or of human life as interpreted by art; it does not suffice to be touched, no matter how deeply, by the pity and the pathos of existence; it does not suffice to appreciate, no matter how delicately, the highest achievements of human genius. We must ourselves be up and doing. We must play our part in the busy social world. We have work to do and duties to perform, and into this work and these duties we must throw our heart and soul. And part of our duty as teachers is to foster this spirit of active endeavor and to guide it to right ends.

Before considering in what manner the teacher may most profitably exert his influence in this respect, it will be well to devote our attention to the motives in and through which control is exercised over conduct. The relative strength of these motives is one of the determining factors of character.

It must be remembered that there is a natural and inherent tendency to action in virtue of innate and inherited capacities or proclivities. From our present point of view we may term such action *impulsive*. It is the characteristic of impulsive action that it is not under due control. The impulse may be either good or bad. However we may explain, or attempt to explain, the mode of origin of the innate and hereditary tendency—and this is a difficult problem which we cannot here discuss—the fact remains that some of us come into the world with a larger percentage of good impulses or bad impulses, as the case may be, than others. But the characteristic of such impulses, whether good or bad, is this: that they are, as such, uncontrolled. A man walking by the water-

side sees a child in peril of drowning, and instantly springs to the rescue ; a high-spirited youth sees a girl insulted by a blackguard, and promptly knocks him down ; a poor starving wretch sees a child carrying her father's dinner, and hungrily grabs it. These actions call forth in different degree our praise or blame ; but they are alike in being impulsive. They are not the outcome of determinate control. We speak, indeed, of motives for such actions, saying that the poor wretch is impelled to his deed by motives of hunger. But it is well to reserve the term *motives* for the determinants of deliberate action ; and to speak not of the motives, but of the *promptings* of impulse. Happy is he who inherits the promptings of social, and not of anti-social, impulse.

The motives under the influence of which we exercise control over our actions are so various, that their adequate analysis presents one of the most difficult problems of psychological inquiry. Fortunately, it is not necessary for us to discuss the matter with any minuteness of detail. Let us therefore consider the question from a very broad and general point of view. It stands thus : Each individual is prompted to action by certain innate and inherent impulses, good, bad, or indifferent ; he is more or less dissatisfied with the actions to which he is thus prompted, and he therefore exercises control over his conduct so as to guide it to ends other than those to which impulse prompts. That which we wish to know is—(1) what are these other ends, and (2) what are the motives for the guidance of conduct to these ends ?

To answer these questions in detail is, I repeat, a

matter of exceeding difficulty, involving much subtle analysis ; but to answer them in the broad and general way which suffices for our present purpose is not so difficult. The "other ends," in all their varying complexity under changing and differing circumstances, may be summed up in a few words, which cover all the multiplicity of their details. The self of impulse does not satisfy us ; our end in view is to realize, through guidance and control, our *ideal self*, to attain unto that better, fuller, richer, truer self that we would be, in place of the meagre and unsatisfactory self that we are. This, it appears to me, is the essential aim in the guidance of conduct. And what are the motives for the guidance of conduct towards the always incomplete, but, as we hope, the constantly less incomplete, realization of our ideal self ? This question, too, difficult as it is to answer in detail, can be answered in a general way almost in a word. *The ideal self must be an object of desire.* Any approach thereto must be accompanied by the emotional tone of satisfaction and content ; any falling away therefrom, by the emotional tone of dissatisfaction and discontent.

In every individual character there is on the one hand the self of natural impulse, and on the other hand the ideal self, not indeed clearly defined and formulated, but seen, sometimes dimly, sometimes with greater distinctness, in its different aspects under the varying circumstances of life. And between these two stands the product of their interaction, the self as actually realized in practical conduct. This self it is, on the actions of which the bystanders pronounce judgment—a judgment which should be

softened by the fact that no one can say what is the strength for good or ill of the impulsive prompting; while the nature of the ideal self, and the power of control effectual to its realization, are alike difficult of estimation.

We seem, however, so far, to have left on one side that which was said to be the keynote of this chapter. The ideal self, it may be urged, is a purely individual matter; while the word "social" was said to strike our keynote. But the ideal self is by no means a purely individual matter. It is, indeed, individual to me in so far as it is my ideal self which I desire to realize in conduct; but it is a social self, a self set in a complex social environment, that I must set before myself as the goal of my endeavors. It is absolutely impossible for us, even if we would, to shake ourselves free of our social surroundings. We live in a community larger or smaller, and in reference to that community our conduct is largely moulded.

But though, since we are social beings, there is, in the conception of an ideal self, tacit reference to the community in the midst of which we carry on our life and work, yet it will be well to bring this important factor into due prominence. For not only do we strive to realize an ideal self, but we endeavor to modify and influence our neighbors; and this both in reference to their relations to ourselves, and in respect of their relations to the community as a whole. Hence we formulate with more or less distinctness an *ideal community,* to the realization of which we must contribute in every way in our power. Herein, then, we appear to have in broad and general outline the ends and aims of conduct; and the

task of the teacher in this respect would seem to be, in the words of our fifth head, as stated at the beginning of this chapter: *To aid him whom we would educate to reach right conceptions of an ideal self and an ideal community; and to foster an effective desire for their practical realization.*

It must not be supposed that by the ideal self and the ideal community I mean something dim, distant, and Utopian; something very pleasant and beautiful to dream about, but having its place in the shadowy cloudland of the unattainable. That is not at all my meaning. If our ideals are incapable of at least partial realization, they will not be operative on conduct. We may dream away our lives in admiring them, and sighing at our impotency to attain unto them, but we shall not be stimulated by them to honest active endeavor. No. Our ideals must be practical; betterment rather than absolute perfection must be our device. They must grow with our life, and develop with our widening experience. Always beyond and above us, leading us onward and upward, our ideal must be distinctly, and yet not too far, in advance of what has already been realized. For if at any time our conduct should realize our ideal, a higher ideal is forthwith conceived, and the interval is again reconstituted. We are like climbers ascending a mountain peak; we see before us the summit in its glittering beauty as the ultimate goal of our endeavors, but to reach it we must ascend slowly and carefully, fixing our attention on some vantage point just above us, and when that is reached looking a little higher. If we make straight for the ideal summit, we shall probably fall into the first crevasse.

But if we proceed upwards slowly and surely, we may—but here the analogy fails. The summit of perfection in conduct we may not hope to reach.

It is hardly necessary to draw attention to the fact that there is no uniformity, nay, let us rather say that there is indefinite diversity, in the ideals both of self and community which different men and women conceive and endeavor to realize. This diversity is indeed as wide as the diversity of human character. And not only is it difficult or impossible to define the social ideal (p. 203) in these matters; it is exceedingly difficult to define the individual ideal in any particular case. For the ideal, though it involves cognitive elements, is not primarily a matter of cognition; nor does an ideal of conduct, any more than an ideal of beauty, admit of that summary preciseness of definition which is so eminently characteristic of a purely intellectual generalization. This man will place self before the State or community at large, and regard the realization of individual character as the highest object of endeavor. That man with broader social sympathies will place first the realization of an ideal community, and will regard as essential to the ideal self the due subordination of individual desires to a desire for social well-being. For some the relations of self to the State will constantly be viewed in the light of expediency, and the means of attaining the realization of the ideal will be predominantly dictated by prudence. For others the light in which these relations are viewed is not that of the expedient but that of the right, and the means of attaining the realization of the ideal will be predominantly dictated by the sense

of duty. For the one, any failure to reach the ideal standard of conduct will be accompanied by regret for error ; for the other, such failure will give rise to regret, rising perhaps to remorse, for wrong. Moralists draw a very sharp line of demarcation between prudential motives and moral motives ; and no doubt, as a matter of ethics, they are both wise and right in doing so. But the difference is very largely one of aspect. The same motive may be prudential from one point of view, and right from another point of view ; and the action to which it leads may satisfy at once the requirements both of expediency and of duty.

But what is *right?* What is *duty?* It is obviously quite impossible adequately to discuss these questions. It must suffice to answer them from that broad and general point of view from which we are considering the whole subject. In the light of what has already been said, the answer is not far to seek. If there has taken form in the mind of any man or woman an ideal self and an ideal community, then any action which conduces to the realization of that ideal is right ; any action which leads away from the ideal is wrong. The constant endeavor to realize the ideal is one's duty. These answers may be, and no doubt are, imperfect and inadequate ; but they will be perhaps more serviceable to us in our practical consideration of the subject than definitions involving more subtle analysis.

And where, in these answers, is there place for that cardinal principle of all vital ethics, a man's duty to his neighbor ? In the first place, it may be replied, that, as already indicated, my relations to my

neighbor form part of my ideal self, which is a self set in a social environment. In the second place, it may be replied, that my neighbor is one of the constituents of that practically existent State whose betterment is an object implied in the ideal community which it is my desire to realize. Thus, my duty to my neighbor, both as an individual in particular relations with myself, and as a member of the social community, are by no means lost sight of. So important, however, is this neighborly relationship, that it is scarcely possible to lay too much stress on it. The ideal community is generalized and conceptual; my neighbor is its practical embodiment in flesh and blood.

It is to my neighbor, also, thus before me in the living flesh, that my sympathies go forth. Sympathy is a matter of that emotional tone to which attention has already been directed. The performance of certain actions carries with it a pleasurable, presentative, emotional tone. When we see similar actions performed by others, a corresponding re-presentative, emotional tone is called up. For example, one who is fond of riding or swimming, and derives keen pleasure from the exercise, experiences sympathetic pleasure when he sees others in full enjoyment of a canter or a bathe. So, too, the sight of sorrow or suffering calls forth in us a sympathetic emotion as we put ourselves in the place of the mourner or the patient. And we are wont to give expression to our sympathy : we congratulate the rider or the swimmer, if opportunity serves, on his success ; we commiserate with the mourner or patient. Nay, we go further than this in our sympathy. We take an active part in the promotion of the happiness and well-being of

our neighbors, and in the alleviation of their suffering and distress. To this, be it noted, we are prompted by our *sympathetic impulses*. But these impulses, no less than those which are wholly self-regarding, need guidance and restraint under the control of the will. For our sympathy may prompt us to actions which on reflection will be seen to be neither prudent nor right. Hence, even in this matter, so far as guidance and control are concerned, we come back to our old position: we endeavor to realize an ideal self whose sympathy is under wise and moral restraint.

One way in which we express our sympathy is through *approbation* and *disapprobation*. We should perhaps distinguish between (1) a mere sense of approbation, which is no more than a feeling of sympathetic satisfaction, expressed or unexpressed; and (2) that more intellectual form of approbation which implies the perception of the relation of that which is approved to a standard or ideal of conduct. Approbation thus stands in the same relation to conduct that appreciation does to literary or other art-products. Both imply a standard or ideal; both express a judgment that the standard or ideal has or has not been reached. In neither case need there be any reference to the grounds of judgment. The judgment expressed in approbation is no more susceptible of being stated in set syllogistic form than is the judgment expressed in appreciation. Although there is here a social ideal analogous to that which we briefly considered (p. 203) in connection with appreciation, yet this is so deeply tinged with emotional tone, and is so largely subjective in origin, that it does not

admit of that universal acceptance which is characteristic of the premises of the syllogism.

There can be no question as to the exceeding importance of approbation and disapprobation as determinants of conduct. Much depends here, however, upon the amount of sympathy. The unsympathetic person is very little influenced by praise or blame; approbation and disapprobation do not to any marked extent cause any alteration in his course through life. On the other hand, the man of artistic temperament is one who is generally keenly sensitive to approbation, and one whose naturally strong impulses, self-regarding and sympathetic, are perhaps more readily guided under the influence of the praise and blame of those who move within his special artistic circle—of those, that is to say, with whom he is in sympathy—than under the influence of any other motives. His ideal self is essentially one with which others must keenly and enthusiastically sympathize.

One question may here be suggested before we pass on. If a man have framed low and sordid ideals—and we cannot blind ourselves to the fact that this may only too often be the case—is it his duty to endeavor to realize them? Is it not rather his duty to frame and endeavor to realize better and nobler ideals? To this question we must reply that it is a man's duty to act, so far as he can, in accordance with his own standard of conduct, whatever that standard may be. It is unfortunately the only real standard he has. When we speak of better and nobler ideals, they are our ideals, not his. And no doubt it is a duty for us who pass this judgment to do what we can to raise his ideals. The question, however, once

more brings into prominence the *social ideal*, by which is meant, not the average ideal of all the members of the community, but the ideal of those who, by general consent of those who are specially fitted to express an opinion in the matter, represent the community *at its best*. Although we cannot say, in the light of our guiding principle, that it is a man's duty to endeavor to act up to this social ideal if it be not also his own ideal, yet we may say that it is the duty of the community in which such social ideal has taken form, to take all reasonable and legitimate steps to bring about the realization of that ideal by all its members. And it is at once the duty and the privilege of the teacher, who is in this respect the more or less accredited agent of the community, to do all in his power to set before his pupils the social ideal of character and conduct.

We have now to consider how the influence of the teacher may most effectively be brought to bear on those with whom he has to deal. The first point to notice is that the teaching should be mainly indirect. That is to say, the most effectual method is not the inculcation of moral maxims, not the supply of a certain amount of ethical material to cognition for intellectual assimilation, but an insensible moral and prudential influence ever present as a wholesome and stimulating atmosphere. Ideals of conduct, like ideals of literary beauty, cannot be directly imparted ; all that we can do is to foster their growth and insensibly to influence the direction of that growth.

We may take it that the actions of the little child are at first wholly impulsive, and that the impulses are in the early days of life altogether self-regarding.

The sympathetic impulses come later; and these, so soon as they appear, must be fostered and guided. It is presumably to the mother that interest and sympathy are first extended. But gradually this sympathy widens, embracing the nurse, father, sisters, brothers, and, perhaps, the four-footed playmates. For some time, however, the home, with its immediate surroundings and branches, forms the utmost extent of the emotional impulses. There is as yet no room in the heart for more extended interests and sympathies. But ere long the time comes when the school, the parish or town, the native land, and perhaps eventually the whole brotherhood of man, come in for their share of the awakening emotional impulses; *esprit de corps*, patriotism, and perhaps universalism, have their birth.

And as the sympathies widen and the sympathetic impulses become more extended in their range, more or less definite ideals of conduct take form in the mind, self-control is established, and reason guides the impulses to ends which gain the approval of conscience and of common sense. It is part of the aim of education to afford the most satisfactory conditions for the formation of right and wise ideals; of a frank, courageous, true, and pure ideal self, and of an ideal community in which co-operation to the best and highest ends is an object of endeavor among all the members.

The personal and magnetic influence of the teacher, whether the teacher be the parent or another, is here of great importance. The influence is more by example than by precept. At all events, when example in any way contradicts precept, it is the former rather than

the latter that will be influential, precepts not acted upon being regarded as shams, and tending to weaken the influence not only of precept but also of example.

In school-life, the general tone of the community, which at this stage of life represents the State, is of enormous importance. Nothing is of more vital moment in a great school than the social standard of "good form" that is developed therein. It is scarcely too much to say that the schoolboy's conduct is more strongly influenced by a desire to conform to the school standard of usage and current opinion than by any other motive. For one who throws himself heartily into the school-life, the stigma of "bad form" is something to be avoided at all hazards. And though the standard of "form" may alter as we go through life, yet the desire to conform to social usage, and so to act as to win social approbation and to escape social disapprobation, is, it would seem, the predominant motive with the majority of us, so long as it does not directly conflict with prudential self-interest. Happy the school, therefore, and happy the community, which possesses a high standard of social usage and custom ; which possesses, in a word, a high social ideal of what the community should be and should do.

In the study of history splendid opportunities are afforded to the teacher of giving an indirect impetus to the development in the pupil's mind both of the ideal self and of the ideal community. For history presents us with concrete examples of strenuous endeavor towards the realization both of individual character and of a better social condition of the community at large. However open it may be to criticism

from the point of view of the scientific historian, there can be no question that hero-worship is of great importance in the development of the character of the worshipper. Hence it has been said : Tell me a man's heroes, and I will read you his character. I have before said that one of the main points of value of history as a school subject, and even as a subject for our bigger schoolboys at the university, is that it widens the sympathies. I would now add that, while it widens the sympathies, it also affords concrete examples of conduct and picturesque material for an insensible and unobtrusive training in approbation and disapprobation. It also affords us the material for drawing the distinction, with reference to concrete examples, between merit and virtue. There are some types of character so happily constituted that we may say of them that there is no merit in their virtue. For merit is proportional to the struggle. And there's many a schoolboy, in whom self-mastery is not yet established, whose half-won goodness, under difficult circumstances, is more meritorious than the easy self-denial of one of maturer years.

Literature, too, as well as history, affords concrete examples of conduct which should be utilized by the teacher in the same unobtrusive and insensible fashion, not moralizing and preaching from the literary text, but stimulating, by his own enthusiasm for certain excellencies of character, a like enthusiasm in the minds of his pupils. In many cases the literary artist has had in view this wholesome influence on his readers in the creation of his characters. It is part of his aim to subtly indicate through the portrayal of character what is his own ideal self and what

his ideal community. And it is one of the functions of the artist to lead us to see, through the delicate emphasis which characterizes his synthesis, features which would otherwise have escaped our duller vision. As Browning says in his *Fra Lippo Lippi*—

> "For, don't you mark? we're made so that we love
> First when we see them painted, things we have passed
> Perhaps a hundred times nor cared to see;
> And so they are better, painted—better to us,
> Which is the same thing. Art was given for that
> God uses us to help each other so,
> Lending our minds out."

What we have to do as teachers is to "lend our minds out" to the best possible purpose. For we too are artists; and the materials with which we have to deal are human minds and their environment. We have so to organize the conditions of growth that there shall result the development of fine character and right conduct. As already pointed out, we are mainly at work upon the mental background. It is our object to make this background as rich and full and orderly as possible, so that whatever is brought to the focus of consciousness shall be set in a relational background which shall give it meaning; and so that our pupils may be able to feel the truth of the words which Browning puts into the mouth of Fra Lippo Lippi in a passage which follows closely upon that which I have just quoted—

> "This world's no blot for us
> Nor blank; it means intensely, and means good:
> To find its meaning is my meat and drink."

And, once more, so that not only the intellect may be stirred, but the whole background thrill with

emotional tone, and our pupil may again exclaim with Browning—

> "O world, as God has made it! all is beauty;
> And knowing this is love, and love is duty."

There can be no question that this adequate preparedness of the background of which I am speaking adds enormously to our enjoyment as well as to our power. I stood a few days ago on the battlements of Stirling Castle, and, having at length dispensed with the kindly importunities of the guide, looked round on a scene which, even to my imperfect knowledge of Scottish history, was set in a background splendidly rich in noble, unselfish, and patriotic endeavor. As I stood and felt that the heroes who had breathed their undying spirit on the place were actuated by noble ideals both of self and State, a guide came round discoursing in set phrase of places and dates. A worthy Cockney turned to me, whom apparently he recognized as a brother Cockney—for I too was born within the sound of Bow Bells—and said, "I don't think much of this place. It ain't a patch on the Tower of London. But a lot of Johnnies seem to have worried around here." I fear his background was terribly meagre. He told me that it was the block and headsman's axe that interested him most in the Tower of London; and he seemed to have some slight glow of enthusiasm when the guide indicated the position of the Heading Hill and Stone, and spoke of the execution of the Duke of Albany and his two sons, with his father-in-law the Earl of Lennox. Then he began to feel that he had not come to Stirling quite in vain.

Think what a man misses from the point of view of pure enjoyment if the background of consciousness be nowise prepared by a knowledge of the great deeds which are recorded in the pages of history, and by a knowledge of what men of action and men of thought have done, not only for their own time but also for us. They enter, if indeed it be worth their while, Wordsworth's cottage at Grasmere, and leave it with a shrug of the shoulders, saying that they suppose it was good enough for a poet. They pass through the village of Chalfont St. Giles, and do not think it worth while to look into the little room in which *Paradise Lost* received its finishing touches. They go to Stratford-on-Avon, and wonder what makes Americans flock thither. But it is with the effect on character and conduct that I am now chiefly concerned. The man who, from poverty of mental background, is stirred by none of these things, misses an influence on character and a stimulus to conduct which are of incalculable value. A soldier whom I met some time ago told me that, when he was a young subaltern, and was getting slack, as he expressed it, he was pulled together by a pithy but effective remark of his superior officer. "Take care," he said; "you're forgetting Wellington, and the history and traditions of the army." There's many a lad who has been spurred to his best endeavor, and restrained from a mean or ignoble act, by the flashing across his mind of the name and figure of one of his heroes in history or in fiction. A man of science, who himself did good work in physics, told me that, whenever he scamped an experiment, he saw the grave, reproving eyes of Faraday fixed upon him.

There is one influence on character and conduct of which I have not spoken, and of which I feel it difficult to speak—the religious influence. It is a matter on which it is easy not to say the right thing—to say, rather, what may not be helpful, and may lead to misunderstanding, even if it do not give offence. I shall therefore content myself with one or two remarks, with the object of bringing this influence into line with our mode of regarding the subject. First, let me say, then, that any great religion, worthy the name, presents a concrete personal embodiment of the ideal self. For the Christian, Christ is the type of the perfect self, and the imitation of Christ is a means to the attainment of self-realization. And for him Christ's teaching embodies, in essential outline, the fundamental relationships which characterize the ideal community. Until he learn the lesson that antagonistic self-assertion, or class assertion, must be subordinated to the mutual self-sacrifice which is necessary for co-operation, we shall never practically solve the social problems not only of our own time, but of all time. Secondly, I would say that the essence of religious teaching, in so far as it is influential upon character and conduct, is rather the development of what we may term the *religious attitude*, than the formulation or acceptance of religious creeds. Assuming as granted the existence of a power or central activity, whether immanent or external, of which the world in which we live is the phenomenal manifestation, I say that the essential feature of our relation to that power is not the intellectual attitude of accepting this or that formula, but the religious attitude of submission and humility; of

reverence of all that is noble, pure, and honorable, as the highest expression of God's will. For we clothe the conception of an energizing activity with our highest and most sublime ideals, and name Him, in humility and reverence, God. And when we endeavor to realize our highest ideals of personal conduct and character in relation to our fellow-men, we do so, if the religious attitude is influential on conduct, not only for their own sake, but as duties which are sanctioned by religion.

Finally, let me once more say that our desire to lead a wise, right, and religious life must be inextricably inwoven into the mental background which, as we have seen, is the seat of the character. And let us remember that in every act of our lives, no matter how trivial, we are laying the foundation of all our future conduct. As Miss Edith Simcox has said, "Does it seem a trifling thing to say that in hours of passionate trial or temptation a man can have no better help than his own past? Every generous feeling that has not been crushed, every wholesome impulse that has been followed, every just perception, every habit of unselfish action, will be present in the background to guide and to restrain. It is too late when the storm has burst to provide our craft with rigging fit to weather it; but we may find a purpose for the years which oppress us by their dull calm, if we elect to spend them in laying up stores of strength and wisdom and emotional prejudices of a goodly human kind, whereby, if need arises, we may be able to resist hereafter the gusts of passion that might else bear us out of the straightforward chosen course."

NOTES

P. 15. "Generic idea." The reader may profitably ask himself how far the visual idea suggested by such a word as "primrose" is particular and how far generic. He may find that the word suggests the visual image of a primrose growing in a particular bed of a garden familiar in childhood, and may be disposed to regard the image as particular. But scarcely any two individual primrose flowers are exactly alike. If, however, the visual idea is, strictly speaking, particular, it is the representation of one particular primrose flower. This is seldom the case.

P. 19. "It results from . . . associated." The "first," "secondly," and "lastly" are not here intended to indicate necessarily the order of procedure in time. They serve to express what would seem to be a logical order of procedure.

Pp. 44 and 153. In considering the nature of *interest*, the statements on these two pages must be taken together. Even so they are no doubt inadequate. The reader should ask himself what are the psychological conditions of interest.

That which has little or no connection with our experience or knowledge possesses for us little or no interest. On the other hand, that which is so connected draws into the margin of consciousness, by suggestion, some of the representative elements with which it is related. It forms the nucleus of a closely interrelated field of consciousness. This is the sense in which the statement in the text on p. 44 is to be taken; the statement on p. 153 indicating the accompaniment of emotional tone. On this foundation the reader should build by drawing from the stores of his own experience.

P. 82. The distinction between quantity and number is perhaps unfamiliar, especially to those unacquainted with physics. The following quotation from Professor Clerk Maxwell's article "Atom" in the *Encyclopædia Britannica* (ninth ed., vol. iii. p. 37), will serve to make it clearer. "It is probable that the first exact notions of quantity were founded on the consideration of number. It is by the help of numbers that concrete quantities are practically measured and calculated. Now, number is discontinuous. We pass from one number [whole or fractional] to the next *per saltum*. The magnitudes, on the other hand, which we meet with in geometry, are essentially continuous." Though this distinction is by no means always carefully preserved, it should be clearly grasped. A line 5·55 inches long is continuous; in measuring it we break it up (a matter of distinguishing analysis,—see p. 100) into 5 units of one inch + 5 tenths of that unit, + 5 hundredths of the unit. The line is a continuous quantity, the measurement of which is expressed in numerical terms.

Pp. 101, 104, 110. That conception and the formation of general ideas are fully conscious, intentional, and voluntary processes, will by some be regarded as open to question. No doubt there is a preconceptual stage, prior to the fully conceptual stage here described. No doubt the term general idea may be applied, loosely as I think, to the products of this earlier stage. It is, however, none the less true that the more perfect the concept, the more fully is it the result of a fully conscious process intentionally directed to the end of rendering it clear as a concept. In the process of development there probably, in many cases, intervenes between the generic idea and the concept, the employment of the name for the generic idea used as a symbol, the full meaning of which is not realized until thought is, at a later period, focused upon it.

P. 113. Whether we can form particular abstract ideas is perhaps open to discussion. Unquestionably it is often through the mental interference, so to speak, of many particulars that some quality becomes more or less detached from others so as to be first predominant and eventually

abstract. It may even be said that this is generally a factor in the process by which abstract ideas are reached. But is it essential? If, however, the statement in the text leads to introspective questioning, it will have served its purpose.

P. 117. "We are not . . . concept circle." If we wish to give a generalized description, say of the dog, we either describe a particular dog taken as representative of his kind, or we describe what we regard as the distinctive characteristics of this kind of animal. In the former case we are describing a particular dog taken as the type; in the latter we are, in effect, defining the species.

P. 136. "All laws are enactments," etc. This breaks the first rule of the syllogism, that there should be three terms only. For, since the word law is used in two senses, it stands for two terms, and there are four terms instead of three. Technically, therefore, this is a case of the "fallacy of four terms," and is an example of "the ambiguous middle."

P. 143. In saying that "the background in which the object is set is, at any given moment, the representative of all the potentiality of the mind," the meaning is that the impression or idea, as focal nucleus, aggregates around itself, through suggestion, a number of interrelated representative elements; and that the nature of the background so constituted is determined by the whole process of mental development—subject, of course, to the conditions of health and mental vigor of the moment in question.

P. 148. "The emotions, then, . . . the other." Nothing is here said concerning the part played by the psychical data afforded by the disturbed action of the heart, respiratory organs, digestive organs, glands, and so forth, in producing the states of consciousness we term emotional. Their rôle in the primary genesis of emotional states is discussed in chapter ix. of my work on *Habit and Instinct*. Any such discussion would here be out of place.

P. 155. "It is that which in its varied phases is sometimes termed *insight*," etc. The distinction between *intuition* and *inference* should be clearly grasped. In infer-

ence the logical relations are rendered explicit; in intuition they remain implicit. The former is a fully conscious process as such; in the latter the process, as such, is subconscious. The results of the two processes may, however, be similar.

P. 170. The relation of the word, such as an abstract noun, to the concept is one which the reader should carefully think out for himself. Such a word may be regarded as a centre or nucleus of divergent conceptual association. The concept is thus largely a matter of mental background, and is often rather potential than actual; that is to say, we do not pause to unfold the conceptual implications. One may go so far as to say that it is impossible fully to realize a concept in a single moment of consciousness. It is like a check or draft which can be cashed if there is money in the bank to meet the demand. The question may be asked: Is there always present to the mind an impression or a sense-idea, such, for example, as the word "triangle" or the symbol $\triangle$, as a nucleus of the concept?

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